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IMPROVED PRINTING PRESS.

The accompanying engravings illustrate a new card and job-printing press of very simple construction, yet possessing many advantages, which will be easily recognized in the following description by all who have some knowledge of printing, and especially by those who have had practical experience in the working of "job-printing presses."

The "bed," or that part of the press upon which the type "form" is placed, is supported by two uprights, the lower ends of which are attached to the frame of the press in such manner that the uprights can vibrate forward and backward. At a proper distance back of the "face" of the bed runs a shaft, longitudinally, to which the bed is fastened, and the ends of this shaft pass through the upper ends of the uprights, so that the shaft can turn in them. This bed is counterbalanced on the opposite side of the shaft. On the lower side of this bed are two projecting arms, one near each end of the bed; to the ends of these arms are hinged two corresponding arms of a frame which supports the "platen," or that part of the press upon which the article to be printed is to be laid; and the platen is attached and held to this frame by means of screws, which serve likewise to adjust the platen to the type-bed. At each end of this platen-frame, a short piece is attached by means of a bolt, on which this piece can move freely, and the other ends of these short pieces are fitted between the sides of the press-frame, and are supported by a shaft running through them and through the sides of the frame; these short pieces assist in supporting and guiding the platen during the operation of the press. This shaft running through the ends of the short pieces and the frame of the press, has a toothed wheel fastened to it on one side of the press and a plate wheel on the opposite side; these two wheels have corresponding bolts placed eccentrically to the center of the wheels, and from each of these bolts, one on each side of the press, runs a connecting rod to the shaft of the type-bed. Another short piece is attached to the type-bed, eccentrically to and below the shaft of the type-bed, by means of a bolt on which it can turn, and the other end of this connecting piece is attached to the frame of the press by means of an adjustable eccentric; this connecting piece causes the bed to rotate and reciprocate when the press is in operation, and by the adjustable eccentric the taking of an "impression" may be suspended. A round table is attached to the type-bed for the distribution of the ink—rotating during the working of the press, so as to always keep the ink spread evenly. The inking-rollers are held in stationary supports, without resort to springs, and are kept in their places by their own gravity; they are, therefore, easily put on or taken off the press. A pinion or small wheel fastened to a crankshaft gears into the toothed wheel before alluded to; this shaft has a fly-wheel attached at the left side of the press and a treadle inside of the press frame, by which the press may be worked by foot. The press may also be worked by steam or any other power adapted for such purpose. We have seen it in operation, and it runs very easy and requires but little power; it is made for printing cards and paper, and has a separate and very simple arrangement for each purpose.

Fig. 1 represents the press with the card arrangement attached, and in a position where the card to be printed has just been laid upon the platen; and Fig. 2 shows the position which the bed and platen assume during the giving of an impression. All the parts which have to resist the greatest strain of the impression are made of wrought iron, which renders the press substantial in all its parts. When the type-form is to be put on, the bed is turned face upward (as shown by Fig. 1), and the form is laid on the bed and fastened in a convenient manner; should corrections be necessary, these may be made without removing the form from the bed—the same can be brought directly under the eye. The bed is drawn directly to the platen by means of a crank movement when the impression is to be given. During the operation of the press, the type-form and the ink-distributing table are passing and re-passing under the inking rollers, for the purpose of inking the type-form and for supplying the inking rollers with ink. The card arrangement is easily put to the press when cards are to be printed. By the turning of the eccentric bolt beforementioned, by means of a short lever attached to it, the taking of an impression is suspended, and during the suspension of the taking of an impression the operation of the card-drop motion is likewise suspended; thus, if a card has been laid upon the platen, and then the taking of an impression be suspended, this card will be retained on the platen until the impression is put on again and the card is printed, after which it will drop into a box suspended under the bed and platen. This card arrangement is different from that of any other press we have ever seen, and operates beautifully.

The card arrangement is removed from the platen when paper is to be printed, and side grippers are used to hold the paper to the platen, and thus relieve it from the type when it has received the impression, after which the printed paper is removed from the platen by hand; these side grippers are easily adjusted to the size of the type-form, as they are held in their proper position by springs only, and may be put in any position between the type-bed and platen without setting the press in motion. These grippers for holding the paper are moved outward, one toward each end of the platen, when the card arrangement is put to the press, as shown in Fig. 1. This press has been examined by a number of experienced printers, who all pronounce it superior, in many respects, to any other job press heretofore brought before the public. A patent for this invention was granted, April 24, 1860, to the inventor, Fred Otto Degener, who will be happy to give any further information concerning it on application at his office, No. 171 Canal-street, this city.

Fig. 1

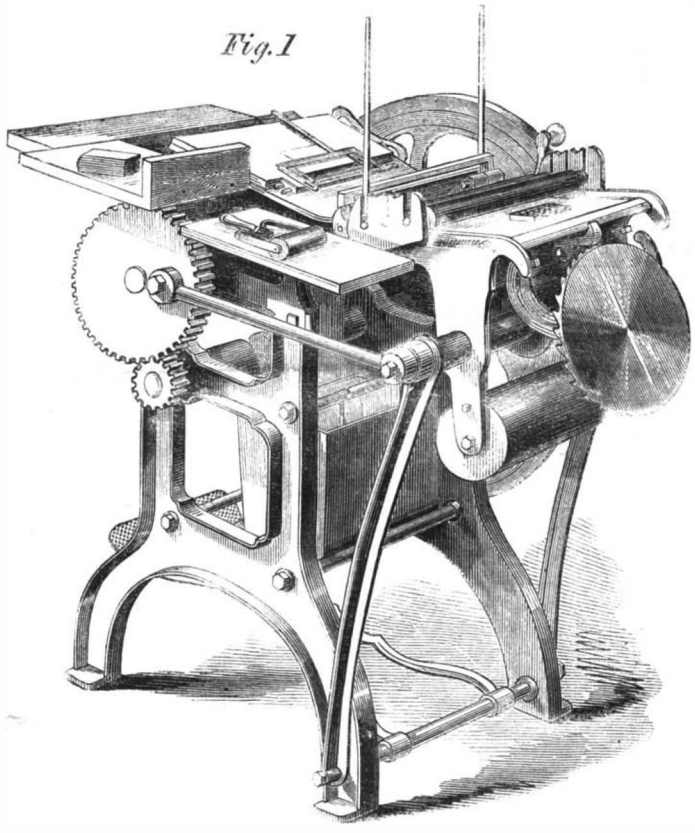
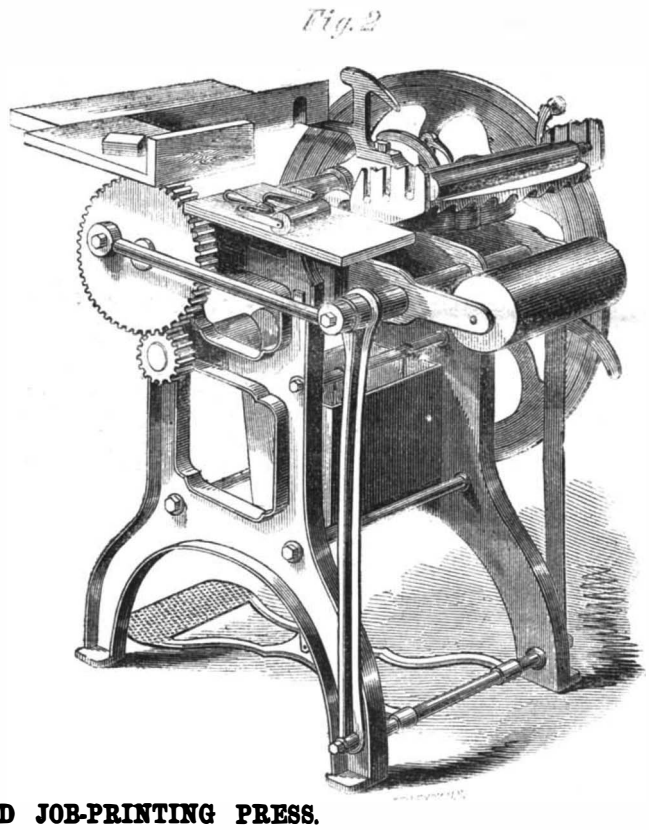


Fig. 2



DEGENER'S IMPROVED PAPER AND JOB-PRINTING PRESS.

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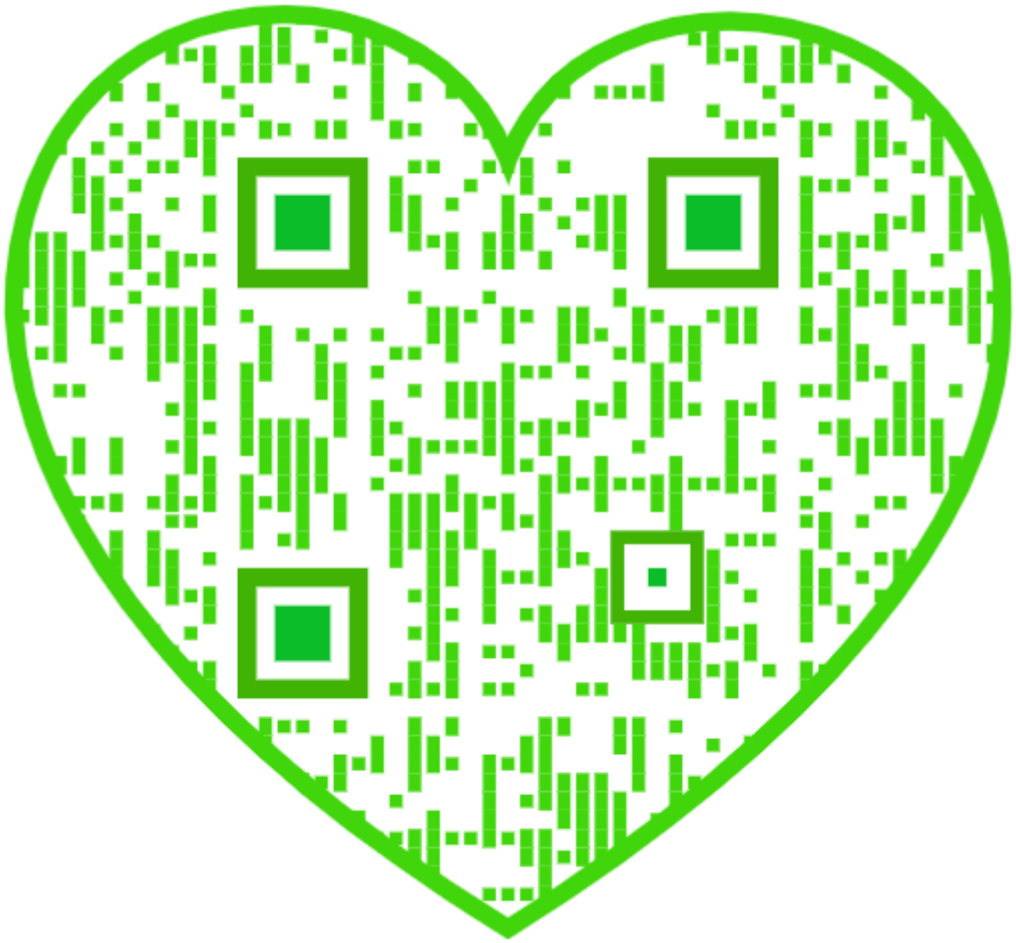

OUR SPECIAL CORRESPONDENCE.

A Trip to Texas—Competition in Sleeping Cars—$3,000 a Year yielded by one Car!—Prodigiously Profitable Patents—Punctuality of the Trains—The Country around Rochester—The Workshops of the West—Cleveland and its Manufactures—A Tornado on the Mississippi—"Yellow Jack" in the South.

MESSRS. EDITORS:—I left Chambers-street, New York, at 5 o'clock, P. M., on Thursday, May 24th, for a swift trip to the heart of Texas. Buying for $48 a through ticket to New Orleans, by the way of Albany, Buffalo, Cincinnati and Cairo, I arrived at Albany at a quarter before 11, and, by the advice of a fellow passenger, ran to secure a berth in a sleeping car. But there was no occasion for haste, as there were two of these cars, and they were hardly half filled. Observing a manifest competition in securing passengers, between the two men in charge of the cars, I inquired what was the meaning of it, and learned that these are private enterprises; the patentees having the cars built on their own account, and giving the railroads the use of them on condition of being allowed to draw what revenue they can by the sale of berths. The price is 50 cents for a single berth, and $1 for a double one. The manager of the car on the Cleveland and Cincinnati road told me that his car had 56 berths, counting the double ones as two, so that his receipts ranged from $56 downward, for the round trip, never having been less than $18. He makes two trips a week, and if we call his average receipts $30, one car yields a revenue of over $3,000 a year—two or three times as much as a large farm. The original cost of a car is about $3,000, and of course the cost of repairs and superintendence is considerable. These cars are an invaluable luxury to people who travel night and day. It is true that the berths are narrow and uncomfortable when compared with broad beds and clean sheets, but when a person has been sitting all day, it is an inexpressible relief to be allowed to stretch out horizontally for a few hours during the night; and though the pint of water each and a single towel for the whole company contrasts unfavorably with the copious supplies of Croton and clean towels which are had at home, even these imperfect means of ablution are immeasurably better than carrying the cinders of the day before, sticking to your face all through the morning.

I took breakfast at Rochester, N. Y., dinner at Erie, Pa., and supper at Cleveland, Ohio; then breakfast, the next morning, at Seymour, Ind., dinner at Olney, Ill., and breakfast, the next morning, at Columbus, Ky., being only one meal in each of these large States, as I swept through them. Having, as above-intimated, left Chambers-street at 5 P. M., one day, and arrived in Cleveland at 5.20 P. M., on the next, the whole distance traveled was 641 miles in 24 hours and 20 minutes, or, counting from Thirty-first-street, the distance was 640 miles in just 24 hours. Still quicker time than this is made going eastward, as the Cincinnati express is 13 miles from Cleveland, 24 hours before it arrives in New York, making 654 miles in a day. I arrived at Cairo, at the mouth of the Ohio, at 11 o'clock on Saturday night. In all this distance, running night and day, all the stations have been reached, and all the connections with the numerous cross and branch roads have been made within one minute of the schedule time. What a wonderfully-complicated and beautifully-operating machine is the system of railroads of a great country! To see an express train tearing forth into the darkness of night, wholly unconscious and reckless of the fallen stones, sleeping cattle, broken bridges or other obstructions that may lie in its path, seems to indicate a sublime trust in the care of Providence or a fool-hardy confidence in the perfection of human arrangements. And yet, with the exception of rare accidents, how surprisingly regular are all the operations of the system! They are surpassed only by the movements of the planets in their appointed courses.

Taking such a wash as was possible in the car, I sat down on Friday morning to enjoy the view of the charming country through which we were rolling, in the neighborhood of Rochester. It is a most beautiful and delicious region. It is true that, early in a clear morning, in the last of May, almost any country looks finely; still, in the whole route from Albany to Cairo—through the wheat fields of central New York and the settlements of Ohio, among the clearings in the forests of Indiana, and across the broad prairies of Illinois—the thrifty villages, the neat dwellings, the cleanly-tilled fields and the broad and dark green leaves of the forests and orchards are all the unmistakable indications of a fertile soil.

Twenty years ago, I passed through the West, and prophesied then a rapid growth of the manufacturing interests, but they have far surpassed my anticipations. Almost every town has its machine-shops, foundries, flouring mills, &c. At Cleveland I observed large piles of stoves which had been cast in that place; the cars bore the name of a Cleveland manufacturer; and the conductor told me that, hereafter, they were to make their own locomotives.

I am now 21 miles below Cairo, and it is 530 miles, by railroad right down the Mississippi, from here to New Orleans, making 1,843 miles from New York to New Orleans. The 21 miles from Cairo to Columbus are passed by steamboat, and it so happened that we were caught in a tornado on the river, nearly equal in violence, it is said, to the one which made such havoc in Cincinnati, last Monday. We tied up to the bank, and the delay costs us 24 hours. I have enjoyed the trip exceedingly, so far, and hence I feel better than I have done before in six months, and I should like to make the same journey every Spring. Before I left New York, I noticed that the yellow fever had already made its appearance in New Orleans, and yesterday's Cincinnati *Commercial* says that it is very sickly in Texas. B.

Columbus, Ky., May 27, 1860.

THE UNITED STATES PATENT OFFICE.

MESSRS. EDITORS:—Presuming that the readers of the SCIENTIFIC AMERICAN will be interested in various matters transpiring at the federal metropolis, I propose to occasionally drop you a line, as circumstances will permit, concerning such things as I may deem of most interest.

Doubtless, a great portion of your readers are interested in patents and the Patent Office, and to such I would say that the building of that great establishment is nearly completed. The interior of the north front is in the hands of the plasterers and painters; the rooms in the basement and on the main floor are finished and are now receiving their furniture; they are to be occupied by the Department of the Interior, the Pension and other offices. There are forty rooms in those two stories, each about 21x24 feet square; also two large anterooms. The upper story will comprise a great hall, similar to and in continuation of the three great halls now used for the exhibition of models; when completed, all four will be thrown into one, which will probably be the largest and best exhibition hall in the world. I presume that, when the Patent Office needs the whole building, those portions now used by the Department of the Interior proper (the Land Office, the Indian Office and the Census Office), a separate building will be prepared for this trio. The large courtyard that is surrounded by the Patent Office is being handsomely laid out with flagstone walks, grass plats, and two fountains of Potomac water, which will add much to the beauty and health of the premises.

The business of the Patent Office goes bravely on, accumulating from day to day and from year to year; and the questions are often asked, "Will not the inventive genius of the country cease?" "Is there anything new under the sun?" To both these interrogatories, we can only answer by saying that there appears to be no end to applications for patents, and it is well known that a vast number are granted. The issues, amounting to an average of one hundred patents per week, afford presumptive evidence that the value of patent property is duly appreciated by a large class of our citizens. What a contrast is apparent between the number now granted weekly and that which was issued seven years ago, when the patents averaged only about twenty per week, and then only after many of the cases had been pending for months! But about the time referred to, a strong arm, combined with a clear and energetic mind, took charge of the Patent Office and gave it a start—an impulse—a mighty bound forward, which carried it onward for several years with increased success; and though the same mind does not now preside there, the influence which it gave and the rules which it established are felt, and have been adopted and continued by all successors, much to their credit and to the benefit of all concerned. So may it ever be, and so may the benign influences dispensed by the Patent Office be seen and felt in the improved condition of all the mechanic arts, in the improvements and facilities brought to light and put into practical operation through the protection afforded to inventors, to the great advantage of our people generally!

Several members of the Japanese embassy have taken great interest in the Patent Office, and have visited the building several times; they appear very quick to comprehend the working of the various machines, as shown by the models, and inquire particularly for dredging machines, looms, oil presses and printing presses. The worthy Commissioner affords them every facility for examining both models and drawings, and they appear to appreciate every attention shown them. The *attachés* of the embassy seem to have the "freedom of the city," as they enter all places of business and manufacture and watch, with great attention, the labor and handiwork of the mechanics and the working of machinery by steam. It is said that some of the Japansse are learning the daguerreotype business at Brady's gallery, and that they are apt scholars. Quite a party of the officers and their artists have been witnessing the operations of the telegraph. SCRIBE.

Washington, D. C., June 2, 1860.

BALANCING MACHINERY.

We take the following useful extracts from a recent number of the *Journal of the Society of Arts*, in England, written by a contributor:—

We frequently observe in workshops, factories, and mills, where machinery is in operation, that the floors, the walls, and even the ground in the neighborhood is in a state of constant vibration, causing an unpleasant sensation and a reasonable fear of danger. Now, the principal cause of such results arises from the inaccurate balancing of the drums, pulleys, and gearing, as the following fact will illustrate:—Belonging to one of the largest machine-works in England there was a large shed, in which was a circular saw, driven by a pulley on a counter-shaft affixed to the roof beam; this shaft was driven about 600 revolutions per minute, and the pulley was thirty inches in diameter; it caused the beam and roof to vibrate exceedingly, to prevent which the proprietors secured large upright and spur timbers to the beam and to the stonework on the ground; when the shaft was put in motion the vibration was as great as ever, and shook the ground all about so that draughtsmen and clerks in a building on the other side of the street complained of its interference with their operations. The foreman of the works mentioned these facts to me, and I informed him that the pulley was not balanced; "but," said the forman, "it is beautifully turned and polished and runs as true as a hair.' "It matters not," said I, "it is not balanced." I then showed him how to test it, and he found that the pulley was 2½ lbs. out of balance; it was then adjusted and perfectly poised and again set in motion. The result was most satisfactory; it worked without any perceptible vibration, and, as was remarked, as quietly as a lever watch. It thus appears that the small weight of 2½ lbs. uncounterpoised, and revolving at a velocity of 4,000 feet or 5,000 feet per minute, is sufficient to exert the marvelous force described; and when we consider that there may be hundreds of wheels, pulleys, &c., similarly poised in mills or workshops, we can account for much of the vibration. Attention is not sufficiently directed to pulleys and wheels; they are seldom tested after being finished. It is true, the heavy gearing and spur-wheels seldom attain a high velocity, but as momentum is the compound of weight multiplied by velocity, and in heavy gearing, such as wheels of one tun weight, the inaccuracy of balance may amount to 50 lbs. or more (no attempt being now made to test them), it follows that, in such a case, a wheel making 100 revolutions, and being 50 lbs. out of balance, will cause as much vibration as one making 1000 revolutions, and being five lbs. out, at a similar distance from the center.

Some engines, lathes, and tools work steadily, whilst others, by the same maker, from the same patterns, are quite unsteady, although bolted down to extra stonework; neither the engineer nor machinist at all divining the real cause of the difference. But the most important of all, perhaps, is that of railway wheels; for although great attention is paid to construct the wheels so as to insure accuracy, they are never tested in any manner whatever after they are fixed to the axles, to prove that they are accurately balanced or poised.

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There is no doubt that there are hundreds of thousands of wheels now working on railways which are exceedingly out of balance; every one must have experienced the oscillation, both lateral and to-and-fro, in traveling on a railway; of course, much may be ascribed to the rails, and much to the bad working of the engine, but a great deal is caused by the wheels of the carriages; and when we consider the results before alluded to, 2½ lbs at a velocity of 4,000 feet or 5,000 feet per minute, what must be the effect on a carriage of 9½ lbs. going at a speed of 2,000 feet or 3,000 feet or (as in express trains) of 5,000 feet per minute!

It will be readily imagined that where there is a constant working of the buffers and springs, there is a constant wear and tear, and the bolts, screws, and joints must rapidly become loose, for, although constructed of enormous strength, nothing can withstand the separating force of vibration; there is also a large amount of needless wear and tear upon the rails and permanent way, as well as great injury to goods caused by the oscillation also a wasteful expenditure of power, so that altogether it is probable millions of money are by these means lost to the railway companies every year; and lastly, but a most important point, causing uneasiness, danger, accident, and sometimes loss of life to passengers. If the wheels of the engine and carriages be properly balanced, and the rails in good order, there would be very little more oscillation at forty miles per hour than there is at ten.

DYSPEPSIA AND CONSTIPATION.

This disease is not to be cured by medical prescriptions got from books. You must get at the cause and remove it. Of a dozen dyspeptics, scarcely two may be affected alike. In many cases, abuse of the stomach is doubtless the source of the trouble. All aperient pills increases the weakness which causes the complaint; to this rule there is no exception. All nostrums and patent medicines, of whatever pretensions, are injurious. In no case can any relief be obtained from their use.

Whoever uses tobacco or malt liquors, or other constant stimulant, or even coffee, and finds symptoms of indigestion, must first abandon these habits; and it will be time enough to think of active remedial treatment when it is found that the disease is not then removed. Whoever has a troubled mind, or is confined to monotonous toil without exercise of labor or bodily recreation, and finds himself dyspeptic, must first seek relief by correcting these causes; for, so long as they exist, pampering the disease, medicine can be of no avail.

If there be any drain upon the vital powers in any direction, beyond healthful moderation, it must be checked before we can hope to return to the digestive organs the vigor of which they are robbed. No doctor's stuff can supply the natural forces which only the vital chemistry of the living body can create. Like intoxicating spriits, dyspeptic medicines may for the moment exhilarate a patient and make him feel great things; but, afterwards, they each make the trouble greater than before.

Beware of tea and toast, and such like diet as remedies for dyspepsia. These do but impose unreasonable tasks upon impaired digestion. What is wanted is exactly the opposite *regimen*, namely, food that is small in bulk and rich in substantial nutriment; something which, with the least exertion of power, the stomach can turn into rich blood to relieve the poverty of the fluids. Rare beefsteak, for instance, not fried in a pan of fat and sole-leathered, but quickly embrowned on a grid-iron, and served up with the oozing juices of red life; and if fluid accompaniment is desired, let us try port wine, weakened to suit the strength of the organs, but rather reduced in quantity than watered much.

Bran-bread is of no account in this disease. It is excellent for constipation, if used now and then, but not continuously. We must discriminate between these complaints. In constipation, often, the digestion is even super-excellent, and the torpor of the bowels, which occasions the trouble, is due to the too thorough absorption of the liquid parts of our food, leaving a residuum too dry and rigid to be freely moved forward through the curvatures of the lower bowels. The most distressing affliction grows out of the impaction of matter in the colon from this cause, giving dull pains which banish sleep and good humor. Pills are not the remedy for this distress, but tepid or cold water injections, which readily reach the colon, and, by supplying moisture, bring away the obstruction. This treatment, though not a cure but a temporary relief, secures from distension of the bowel, which weakens its muscular power and promotes costiveness; and it also prevents it by dislodging, frequently, remnants which often lie impacted in the colon for years, causing all sorts of distressing feelings.

INFLUENCE OF MACHINERY.

Our valuable Scottish cotemporary, the *Practical Mechanics' Journal* recently published the following truthful remarks:—When the place of hand labor is first supplied by machinery in any branch of manufacture, the wages of those who still endeavor to obtain employment in the working of that particular branch by hand are reduced; but those who have the ability to embrace other employments, and particularly the manufacture or use of the machines which have usurped their ordinary handicraft, reap the advantage of their knowledge or genius, and, by increasing demand for the manufacture, ultimately make more wages than they would formerly have made by hand labor. When the use of machinery was in its infancy, this reduction of wages had more evil effects than it has at the present day, or will ever have again, for the spread of education and moral culture has widened and will widen the abilities of men, and teach them that certain general knowledge especially aids their advance in life. Who so capable as the transcribers whose wages were lowered by the introduction of printing, to undertake the duties of compositors and readers in a printing establishment?—fitted both by their literary attainments, and by the similarity of the employments which they would respectively have to give up to embrace. It is obvious that, with a stout heart and a clear head, all the difficulties of the new style of things would be quickly mastered, the condition of the *ci-devant* transcriber would be ameliorated, and where one copy was produced, thousands of comparatively permanent copies would be sent forth to the world, in their turn to call forth latent energy, and to disseminate knowledge. The history of power-looms and saw-mills show results equally favorable to the general adoption of machinery. All improvements, and amongst the rest the use of machinery in manufacturing processes, substitute extensive employments for circumscribed ones. Society at large participates in the additional production, and is benefited thereby. The general adoption of machinery will bear the test of profit and loss; it is also consonant with the same reasoning which sanctions divisions of labor, and its advantage, furthermore, is proved practically by an appeal to statistics.

SUSPENDED AND SUBTERRANEAN RAILROADS FOR CITIES.

It has been proposed, through the columns of the *Daily Times*, that a lofty iron railroad viaduct shall be constructed, to extend from the City Hall, over the tops of houses and streets, to the Central Park, and that from thence it shall connect with the several railroads that extend from New York to other cities. It is intended that locomotives shall run upon this viaduct and come into the very heart of the city, with their trains, without changing their method of draught at the outskirts from steam to horses, as is now the case. This proposition deserves public attention, because the difficulties and expense to the railroad companies, of employing combined animal and steam power, are increasing with the growth of our population. In London and some other cities, such elevated railroads are in daily use, to the great relief of the crowded streets below, and why may not the same system be adopted for New York with equal benefits. With our modern improvements in science, the mechanic arts and civil engineering, it appears to us, that such an iron railroad viaduct may be constructed without obstructing the streets during its erection, and that it would be a great advantage to the entire community.

Another system has already been proposed (through our own columns) which has the same object in view, and for which we claim equal attention with the above. It is a grand subterranean or tunnel railroad, for the relief of our streets. It may cost more in original outlay, but the difference would not be much, while for durability and a conscious feeling of greater safety, it is to be preferred. We present the two methods to the public; both deserve attention and discussion, for the time is not far distant when one or other must be adopted and go into operation. If we had a government worth a tinker's ladle, we should hear of more inquiries into matters of practical importance for the present and future relief of our city. Property-owners along the lines of railroads are constantly quarreling against the running of steam cars, and our municipal authorities suffer this conflict of interests to wage until one or other succeeds through the power of the court. It is a pity that we have not Louis Napoleon to manage us for a while. He would not only relieve Broadway but he would also devise some plan of mutual accommodation between the railroads and the people, and stop this sort of Kilkenny-cat fighting.

MILKING BY MACHINERY – THE INVENTOR'S REMARKS ABOUT HIS MACHINE.

Messrs. Editors:—I was happy to learn from yours of the 25th ult. that you had succeeded in obtaining both patents on my two cow-milkers. I have fully tested the machine, used it daily for eight weeks, and can assure you that it is a practically useful implement which will come into general use. With some improvements in its construction, lately made, I can fit any cow, as to the distance the teats are apart or the different sizes, without changing the machine in the least; and three minutes is all the time needed to milk any cow in, and with less labor than otherwise occurs. The cows stand quieter, and like to be milked with the machine better than by hand.

There is satisfaction in succeeding in any undertaking; and it affords me pleasure to know that I have not only invented a good thing, but that the thing is mine for 14 years to come, and I am now fully satisfied that you have done the best for me possible. Please receive my sincere thanks for your faithfulness; and I can assure you my future patronage is yours.

Yours, truly, L. O. Colvin.

Cincinnatus, N. Y., June 4, 1860.

[We are having an illustration of Mr. Colvin's apparatus prepared (which we shall publish in a week or two), showing a dairy-maid in the act of using the implement, the cow "standing" as if she "liked to be milked," as Mr. C. states. What will not the mechanical skill of our inventors accomplish?—Eds.

EGG PHILOSOPHY—GREAT BIRDS.

We have heard of "philosophy in a nut-shell" and "philosophy in an egg," and many persons may suppose that philosophy cannot be of much account when it can be cramped into such contracted receptacles. If the value of philosophy were to be estimated by the length, breadth, highth and depth of modern eggs, we would certainly conclude that we lived in degenerate times, in comparison with those supposed pre-adamites who sojourned in the Connecticut valley before the Flood. Professor Hitchcock in his work on "Fossil Foot-prints," describes a biped—*Brontozoum giganteum*—which had a foot 18 inches long, and a step of not less than five feet. It was 12 feet high, and weighed from 400 to 800 pounds. The ostrich is the largest of living birds; his hight is from seven to eight feet, his step is 26 inches, and he only weighs 100 pounds. The old gigantic birds had undoubtedly eggs proportioned to their size. At one time they traversed the Connecticut valley in flocks, and numerous are their tracks in the sandstone near the railroad at Northampton. Hundreds of the foot-prints, as fresh and distinct as if they had been impressed but yesterday upon the mud, are now to be seen in many sandstone slabs.

Economical Coal Burning.—The engine *Delaware*, on the Central Railroad of New Jersey, has run three trips, of 128 miles a trip, with 6,120 lbs. of the American Coal Company's coal. The train (mail) averaged 23 miles per hour, including stops, and consisted of three passenger cars and one baggage car. The cost of coal on the tender is $5 per tun gross. The cost of wood averages $5 25 per cord on the road. One and three-quarters cords of wood is required for a trip of 128 miles. The cost of altering the engine—perforated grate, enlarged smoke-arch, wire gage, straight smoke-stack and sub-treasury—was $100. This shows a saving of above 80 per cent of coal over wood.—*American Railway Review.*

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SCULPTURE.

The art of sculpture originated at a very early age in the world's history; and, without venturing into the controversy as to whether or not it was first devoted to purposes of idolatrous worship, whether it was practiced before the Flood, and whether Abraham's father was a distinguished statuary, we may safely assume the Egyptians and Assyrians to have been distinguished for their progress in this art, and ascribe to the ancient Greeks the honor of having brought it to perfection.

The great superiority of the Greeks in the art of sculpture may be ascribed to a variety of natural causes which tended to foster and improve their taste for the beautiful. No people entertained a higher appreciation of all that is elegant and graceful; they preferred natural beauty to acquired accomplishments; they decreed the first rewards to those who excelled in agility and strength of body; to have a handsome figure was the hopeful desire of every Grecian youth. This love of the beautiful was in every way favorable to art. Socrates is said to have declared the artists to be the only wise men. The artist who executed his work with ability and taste might reasonably hope to have his own statue placed beside those of Miltiades and Themistocles. Thus encouraged and rewarded, art attained perfection; under similarly favorable circumstances, it might do so again. It is not our intention to enter into an inquiry as to the respective merits of the modern schools. Our ambition may be excited, but our pride is humbled, when we look at the Laocoon, the Venus de Medicis, the Apollo Belvidere, &c. Yet the knowledge of infinite superiority attaching to these immortal works should not depress the efforts of our artists, but rather rouse them to renewed exertion. What man has done, man may do. Phidias and Praxiteles may be rivaled, though they can never be excelled.

The mechanical part of sculpture is exceedingly simple, and requires but few tools. The essential element of success is the genius of the sculptor. Roubiliac used to say, "The figure is in the substance of the marble; I only extricate it from the inclosure, or pick out." But before the artist, with chisel and hammer, sets about the arduous labor of picking out the statue, he has something else to do; and those who imagine that his principal work consists in chipping with his tool at the block of marble are woefully ignorant of the real facts of the case, most part of his labor being, in truth, confined to clay and plaster.

The sculptor begins his work precisely as does the painter, by a sketch. Frequently he makes this sketch on paper, but in all cases proceeds with it in clay or wax. In these materials he makes a perfect model of the subject which he intends to execute; thus determining the character, proportion, and effect of his composition. Professional artists almost always use clay, and many of these clay models are annually exhibited in the Royal Academy of Arts, London. The clay employed is of the quality and prepared in the manner in which it is used by potters. It may be readily prepared by wetting it with water, and by working and beating it into a proper consistency. Very few tools are required, and these consist only of small pieces of wood, bone, or ivory, for cutting away the clay, pressing it into form, &c. Most sculptors rely more upon their bare fingers in modeling than upon any tool whatever. This was the practice among the ancients, who especially used their nails to render certain parts more delicate and lively.

Clay, when used for modeling, requires to be kept constantly in a proper state of moisture, especially if metal supports or braces are used in the erection of the model, as these, by their not yielding to the contraction and expansion which take place in the clay, if not kept at an equal degree of dampness, cause the latter to crack and often fall to pieces. The requisite degree of moisture is preserved by occasionally throwing water over the model with a syringe—the rose-head of which is perforated with very fine holes—by sprinkling it with a large brush, or by hanging wet cloths over it during the intervals of labor.

In reference to these remarks, we may observe that, according to the massiveness of the figure and the detached portion of its parts, more or less support is required beyond that which it is in the nature and strength of the clay to supply. For this purpose skeleton braces of iron must be prepared; these should be firmly bolted or fixed to the modeling-stand. Their protrusion beyond the surface of the model may sometimes be unavoidable, but care should always be taken that this may occur at unimportant points. The figure, or group, is then gradually developed by building it up compactly with the clay.

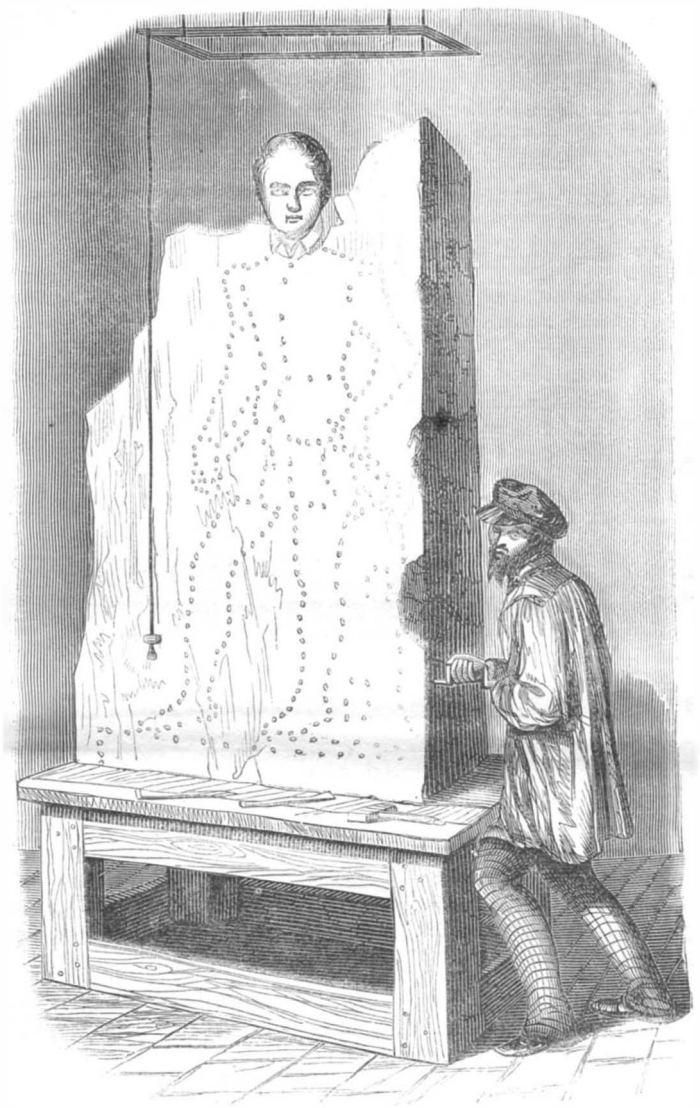
The custom is almost universal with sculptors, whether or not the figures are to be ultimately draped, to model them first of all as nudes. Accuracy of anatomical form is thus secured with a greater amount of certainty.

A cast in plaster is frequently taken from the clay model. This is a very simple process, but requires great care in its execution. A mold of the model has first of all to be taken, into which a mixture of plaster-of-paris and water, about the consistency of thick batter, is poured. The operation should be witnessed before the experiment is made of a first attempt, after which there will be no difficulty in conducting the process.

The finish of the model is often advantageously effected in the plaster. In large or complicated works, the plaster cast is often a very great convenience, as parts of the statue or group—such as heads, limbs, &c.—may be removed and wrought upon separately, under some circumstances, with greater facility than in the position which they occupy in the composition.

The plaster cast is never so beautiful as the clay model; and neither one nor the other equals the completed work, when "the marble, chiseled into life, grows warm." The clay model has been fancifully described as life—the plaster-cast as death—the marble statue as the resurrection.

Hewing the figure, or group, out of the stone or marble, is a simply mechanical operation. The relative sizes of the model and of the proposed work having been ascertained, exact measurements are made of the various prominences of the composition. Thus, on either side, for instance, the shoulders of a figure would be more prominent than the head, and in a face the nose must be more prominent than any other feature. The exact hight and depth of all the inequalities in the model having been taken, the block of stone or marble is bored to the proportionate depths (as shown in our engraving), and the workmen then strike off all the superfluous material, leaving the figure as a rough but exact counterpart in outline and proportion of the clay model or plaster cast. The skill of the sculptor is then shown in all those skillful touches of the chisel which impart life and beauty to the composition—those happy touches which show the genius of the artist, and which can never be given by any mere artizan.



MODE OF CUTTING STATUARY OUT OF MARBLE.

A GREAT BORE.—The great gun cast at Fort Pitt Foundry some months ago is now completed. After having been turning round in its lathe for about three months, it may now be seen rolling along O'Hara-street, on its way from the foundry to the Pennsylvania Railroad. The bore is 15 inches in diameter, and about 14 feet long. It is large enough to hold 16 bushels, and a stout, broad-shouldered man may enter it and pass down to the bottom. While undergoing the different processes of boring, turning and planing, the gun had turned round in its lathe about 65,080 times, and some parts of its exterior surface moved a rod at each turn, making the whole distance which some parts of the iron have traveled, while in the lathe, more than 200 miles. The gun is now encircled by two massive rings, six feet in diameter and one foot of face, which are secured by set screws. The gun serves as an axle, and the rings act as wheels, and roll along together on a heavy wooden railroad. Holes are cast in the face of the wheels to receive iron handspikes. Eight men with the aid of a crate and pulley, move the whole along with ease. On arriving at the railroad, the gun will be suspended between two eight-wheeled platform cars, from trussed beams, which are so arranged on the cars that the whole will be equally distributed on each of the 16 wheels, each wheel bearing 3,000 pounds exclusive of the car, platforms and trussed frame-work. The same cars will carry the gun to Washington City, where it will be transferred to a vessel, which will deliver it at Fort Monroe.—*Pittsburgh Journal.*

A NEW FARM ENGINE.—A correspondent informs us that he recently witnessed the successful operation of a portable engine for traveling on the common road, plowing, and executing several other operations, on the farm of J. O. Wood, about 20 miles from Hannibal, Mo. It was constructed by Messrs. R. L. Steer and George Roberts, of Hannibal, who have taken contracts to plow with it in competition with animal power. On the common road it travels at the rate of from five to six miles per hour, and it is stated to have been very successful.

A STEAM FIRE ENGINE.—Among the many other good illustrations preparing for our next issue (the last of the present volume) we are having executed a large and beautiful engraving of the steam fire-engine just built by Ettenger & Edmond of Richmond, Va., to fill an order from Russia.

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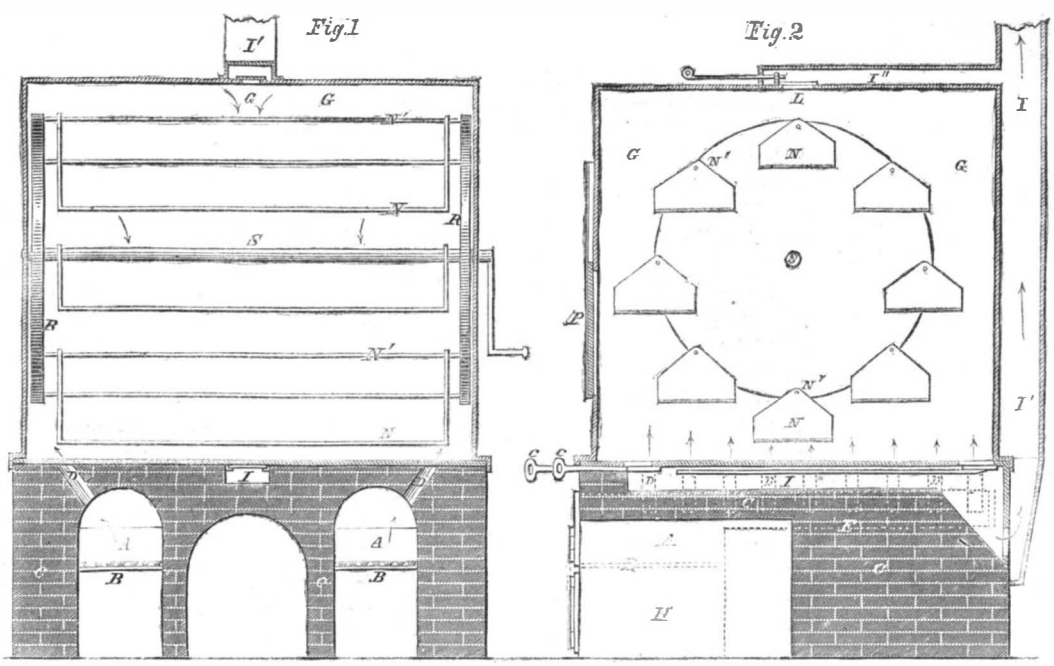
MACKENZIE'S IMPROVEMENT IN BAKING OVENS.

Not long since, all bakers' ovens were heated with wood, but with such fuel constant baking was impossible, because a new fire had to be made for every new batch of bread to be baked. Such ovens having an interior fire cannot be heated with Liverpool or cannel coal, owing to so much smoke being created in the combustion, but with anthracite we have an admirable smokeless fuel, which will permit of constant firing and baking; and the invention illustrated by the accompanying engravings relates to heating bakers' ovens in which such coal is employed. Fig. 1 represents a vertical transverse section of the oven taken through the fire-places, ash boxes and flues, and it shows the direction taken by the heated currents on leaving the fire-places. Fig. 2 is a vertical longitudinal section taken through the oven, in which the central hot-air flue is shown communicating with the main escape pipe, which has valves or dampers in the front and rear. The dotted lines represent an outline of the grate, fire-bridge and hot-air escape passages.



MACKENZIE'S IMPROVEMENT IN BAKING OVENS.

A represents the furnace or fire-place, one or two of which may be employed according to circumstances; B, are the grate bars, C, the brickwork. The dotted lines, Fig. 2, show how far back this furnace and grate extends. E is a back bed of brickwork; D D, are a series of short flues which lead off from the furnace and the space over the fire-bed, E. They communicate with the oven, G, above the masonary. These flues are the only means of escape for the heat from the furnace, except that which is given out by the radiation from the brickwork above the arch. The heat is conducted off very rapidly by these flues from the furnace, and they diffuse it equally through the oven. H, is a coal bunker between the two furnaces; I, is a horizontal flue extending from the front to the rear of the oven. It communicates with a vertical flue, I′, which extends up in the rear of the oven as shown in Fig. 2. The lower horizontal flue, I, communicates with the oven through holes in the front, in the rear it is closed by valves, K K, which can be operated from the front by means of the damper rods, *c c*. At the end of the flue, I, where the products of combustion escape into I′, it is enlarged into a chamber and bent downward into the form of an inverted cone. The point of communication with the flue, I′, is at the lower part of this chamber. This construction and combination of these two flues produce a very free and a more equable draft than if the lower flue extended horizontally and was of uniform size to the escape flue. The draft through both damper openings, K, is thus rendered uniform, the baking operation is improved and a saving of fuel is effected. L, is a valvular opening at the center of the top, it communicates with the main flue, I′, by the one, I″. C′ is a plate of metal covering the brickwork.

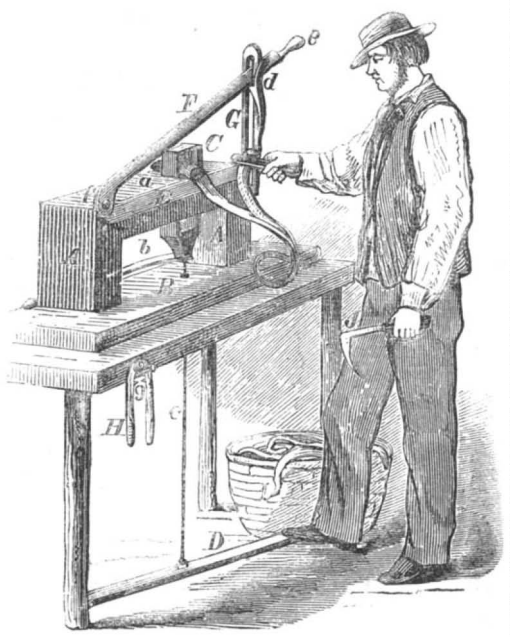
A suitable number of gravitating iron pans, N, are arranged in the oven, being hung on pins, N′. These pans extend across from the circular revolving plates, R R, as shown in Fig. 2. They form a revolving frame on the shaft, S, in the oven, and the pans always swing round with their bottoms downward. The frame is rotated from the outside by the crank handle. The bread is placed in the pans, N, and taken out through the door, P. In this manner all the bread is baked at a uniform heat, as one pan cannot receive more heat than another.

When the fires are well lighted, the front damper or the rear one in the lower flue (or both) may be opened or partially so; when the top one, L, is closed, a downward draft then takes place, the heated air escapes from the flues D, rises to the top of the oven on the sides, then descends in the center to the central flue space and escapes up the main flue. The heated air is thus made to circulate and rotate in the oven so as to diffuse the heat uniformly and rapidly through every part of it, instead of using the heat of radiation as in other coal fire ovens. Direct heat from the furnace is obtained with an economy of fuel, and all the baking is effected with great precision, as the draft—and consequently the heat—is under perfect control.

A patent was granted for this improvement in ovens to Duncan Mackenzie, of Brooklyn, N. Y., through the Scientific American Patent Agency, on the first day of May, 1860, and further information may by obtained by letter addressed to him at 180 Livingston-street, or to Butler, Hosford & Co., of No. 30 Broadway, this city.

PATENT MODE OF SKINNING EELS.

It is an old saying that after live eels have undergone the process of being skinned a number of times, they become so accustomed to it as to be totally indifferent to the operation. But, unfortunately, experience shows that they have not yet arrived at this desirable state of submission, and it is therefore, as every fisherman knows,



necessary to use some means to induce these "slippery customers" to remain quiet while being divested of their external covering. Heretofore, this result has been attained by throwing them violently on the ground, or by bringing their heads in forcible contact with some convenient hard object, and then taking off their skin, by hand, before they recover from the effects of the concussion. But the enlightened genius of this age has produced a machine whereby this process is performed in a manner much more preferable (to the *operator*, not to the eels) than the one just mentioned. A perspective view of this novel invention is shown in the annexed engraving.

The frame of the machine consists of two uprights, A A, attached to a suitable base, B, and connected at their upper ends by a cross-tie or traverse bar, *a*, through which passes a vertical metallic frame, C, sliding freely up and down. In the upper part of this frame two spurs are secured, projecting downward from its upper cross-piece, as shown in the figure. The frame, C, is connected by a cord, *c*, with a treadle, D, underneath the table on which the machine rests. To the frame, C, is also attached the spring, *b*, which has a tendency to elevate it, so as to keep the spurs above the traverse bar, *a*. The leger blade, E, is atached to the traverse bar *a* extending its whole length. The knife, F, is pivoted to one end of the bar, as shown at *f*, and is provided at the opposite end with a handle, *e*. The knife, F, works in a guide, G, attached to the frame, and is held in an elevated position, when not in use, by a spring catch, *d*. The guide, G, is so arranged that the cutting edge of the knife, F, does not pass closely over the edge of the leger blade, but that a small space is allowed tween them.

The operation as follows:—The operator grasps the griper, H—which consists of two jaws, connected at one end by a joint, the inside of each jaw being provided with a spur, as shown at *g*—and by means of it the eel is seized near the head, which is placed on the traverse bar, *a*, and within the frame, C, and by depressing the treadle, the spurs pass through the head of the eel, thus firmly securing it. The operator then opens the whole length of the eel by means of the ripping knife, J. The knife, F, then being depressed, separates the head from the body, with the exception of the skin, which is slipped over by the knife. This effect is owing to the space allowed between the knife, F, and leger blade, E. The operator then seizes the eel with the griper, H, as shown in the engraving, and separates it from the skin which, together with the head, is held fast by the spurs in the frame, C. The treadle is then released and the head and body removed from the machine, when it is in readiness for another eel to be operated upon in the same way.

This device has been practically tested and is found to perform the work in a manner much more expeditious and preferable than when done in the ordinary way; the flesh not being bruised and discolored as is usually the case.

This exceedingly novel and useful arrangement was patented, through the Scientific American Patent Agency, June 29, 1858, to Adam Emeigh, of Jerusalem, L. I.

DEODORIZING THE THAMES.—In 1859, during three months very dry weather, old Father Thames—that once classic stream famous in historic verses of English poets of the last century—became a huge sewer, sending forth fœted odors over all the British metropolis. A report recently presented on the subject contains the statement that £17,700 (about $88,000) worth of deodorizing material was thrown into the Thames during the months of June, July and August. The deodorizing agents employed were chiefly chloride of lime, of which 478 tuns were used, and of chalk lime, 4,280 tuns were used. These were chiefly thrown into the sewers, and while the temperature of the river remained high—from 69 to 74°, the river remained proof against all efforts of deodorization. Great preparations have been made this year to provide a sufficient supply of the perchloride of iron to modify the pungent powers of Father Thames' snuff-box.

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BURIAL OF THE DEAD—MUMMIES—GLASS COFFINS.

Two or three years ago a gentleman of this city was so anxious about the proper disposition of his body, after he should leave it, that he had procured a coffin to be accurately made to order, and kept it in his house always ready for its final use. But this foresight of dissolution proved the very means of hastening that sad event; for one day, reaching for something placed on top of the coffin, which stood on end like a cupboard, it fell forward, crushing him to the floor and killing him instantly. This unfortunate man no doubt was a *connoisseur* in coffins, and had made a deep study of the art of burial. He had been on Potters' Field and knew the fate of poor folk, or had seen the removal of graves about the old Brick Church. And perhaps he had gone but a little way beyond the speculations of almost any one of us; for who does not sometimes think of what shall become of his mortal coil? Certainly all men have a choice in the matter, and many express it. We go to view the ground where we shall shortly lie, we plant the cyprus over the final home, we hew tombs from the rock. We hold as the greatest crime, the desecration of the grave, and we think with shuddering of the feast of worms; and no man envies the fate of poor Yorick, or is pleased with imagining the sight of his own skull on a phrenologist's shelf. Mankind have always had such notions, and the resources of science and skill have always been in request for the perpetual security of what of us is mortal. The decent disposal of the dead is ever looked upon as a sacred duty of the living, and is everywhere surrounded with the solemnities of religion. The denial of burial rites is the last and greatest punishment of criminals. It is only among savages or through the exigencies of war or commerce, that the bodies of men are left unprotected on the earth or cast into the sea.

So it is not at all strange that coffins were used at a very early day, and the first allusion to a coffin in history associates with it the art of embalming. In the book of Genesis we are told that the body of Joseph was embalmed and placed in a coffin in Egypt. The first material for coffins was probably wood, but as soon as the art of working in stone and clay was learned, coffins of the most durable character were made; indeed coffins are among the most interesting relics extant of the remotest antiquity. Layard found plenty of coffins of stone, clay, and even glazed earthenware, about Mesopotamia; and in Egypt and Palestine sarcophagi and tombs are the objects of prime interest to travelers. The Egyptians of all people showed the greatest care in preserving their dead. They removed the most perishable organs of the body, and by the use of spices and balsams, the flesh was rendered imputrescible; the body was then closely wrapped up in linen cloth. The coffin into which the body was now laid, was of pasteboard or a kind of *papier machè*, shaped much like the body, profusely ornamented by moldings, colors and gold. This paper coffin was laid in another of the same material, and this in another and another, still all of paper, and at last the body in its series of four proper coffins was enclosed in one of wood, thus preparing it for its final receptacle of stone, which for kings was a pyramid. In Egypt there are now so many mummies packed closely together, that they speak of mummy by the square league. In some countries (especially Spanish) the coffin is used only like our hearse, as a receptacle of transport to the tomb, in which the body is laid, and closed up by masonry. It is to such a tomb that Shakespere represents that Juliet was carried.

There is quite another method of disposing of the dead which was in vogue in ancient times, particularly among the Greeks, namely, burning or incineration. The body was placed upon a funeral pyre of wood, and the fire was kindled by the nearest of kin or the dearest friend. When all was burned the ashes were carefully collected, placed in an urn and finally enclosed in the tomb. This practice, originating in pagan superstition, disappeared with the rising of Christianity. In modern times a few poets like Shelley, or mistaken sanitary philosophers, have tried to revive the practice without success

In our day we have at command all the materials which are most fit for the manufacture of coffins, and some which our forefathers knew nothing about. Wood has always been the only resource of the poor, but those who can afford it, and are most anxious that the bodies of their friends shall be undisturbed for centuries, will have coffins of lead, stone, pottery, cast iron, &c. The making of coffins (as appears from the fact that every person must have one) is a very important branch of industry and a productive field for the able inventor.

The above thoughts and recollections have been suggested by an examination of a coffin made entirely of clear white glass by Mr. John R. Cannon, of New Albany, Ind. There is no substance so durable as glass, nothing which will so securely keep whatever is inclosed in it, and it is probably only for the reason of difficulties of construction that glass coffins have not been sooner made. The qualities and advantages of glass for the purpose are easily apprehended and need no elucidation from us. The coffin exhibited to us is composed of two parts, each molded by pressure; the joint is made true by grinding, and secured by cement so as to hermetically seal the cavity. For still further security Mr. Cannon binds on the cover by passing around the whole two or more metallic straps, to which are attached ornamented handles. When desired, also, the interior air may be removed by an exhaust pump, or displaced by carbonic acid.

A coffin thus made constitutes a tomb of itself, at at once simple and convenient; and by the simple appliances which Mr. Cannon has invented, it can be made very cheaply, at the same time being susceptible of a great variety of ornamentation, it may be made as expensive as the most costly coffins now used. The application of glass to this purpose is novel, and seems likely not only to open up a new and important industry, but to work important changes in the mode of preserving the mortal remains of humanity.

A NEW FIRE-EXTINGUISHER.

Many of our readers will recollect that, some years ago, Phillip's Fire Annihilator was flamingly presented to the public under the auspices of P. T. Barnum, the Napoleon of popular entertainments. It made considerable noise for a while, and finally disappeared from public view till within a few months past, when we noticed the fact that one of them exploded and actually set a building on fire where it was placed as guard against such a contingency! It needs no argument to demonstrate that to extinguish a fire by the use of gas in the open air is an absurdity, but that combustion can be suppressed in apartments from which external air is more or less excluded is no visionary scheme. A patent for a chemical compound that will accomplish this object was issued to Chas. G. Mueller on the 6th of March last; and we were present at a recent trial in Hoboken, which, although conducted on a comparatively small scale, proved the efficacy of the invention under the conditions mentioned. An apartment measuring 20 cubic feet, provided with 10 holes of $\frac{3}{4}$ of an inch in diameter each, and which communicated with the external air, was used for the purpose. Well-dried pine wood, splints and shavings were introduced into this apartment, and when fairly ignited, a small quantity—an ounce or two—of the compound was thrown in and the door closed. At the expiration of two minutes the door was opened, and all combustion found extinct. Subsequently, two trials were made with alcohol, mixed with powdered resin and with spirits of ether. These highly inflammable fluids were similarly extinguished in the space, respectively, of 25 and 15 seconds. The united areas of the 10 holes was much greater in proportion to the volume of the apartment referred to than the united areas of the crevices to warerooms, holds of vessels, &c., is proportioned to their volume. The compound is put up in a compact, portable form, is easily managed by any person, and can be used at a moment's warning. It is manufactured and sold by Mueller and Carmand, No. 594 Broadway, this city.

TRADE STRIKES.—At a meeting of the Civil and Mechanical Engineers' Society, held in London as reported in the *Engineer*, a paper was read by Mr. A. F. Yarrow, on "Strikes," in which some very original and sound views are enunciated. He showed that the capitalist and mechanic are the same in relation to one another as the buyer and seller of commodities, and inferred that as the value of commodities is fixed by supply and demand, wages must therefore fluctuate under the same law. In order to raise wages, machinery, warehouses, railroads, &c., must be increased. Strikes are nearly always unsuccessful, and are injurious to all parties. There have been very few successful strikes—so called by the operatives gaining their point—but were ultimately injurious. Many strikes had taken place on the introduction of machinery, but it was a great mistake to suppose that improvements tended to lower wages. If this were the case, then the highest wages would be paid in those countries where inventions were unknown and where the people were neither thoughtful nor inventive. As machinery increases our productive powers, it has also a tendency to raise wages, because it tends to increase the stock of capital. The sum of the lecture was:—1. That wages can only be raised by increasing industry, sobriety, honesty, &c., in order to augment the stock of capital. 2. Strikes are in all cases attended with injurious effects, largely compared with the advantages, even when they are successful.

INDUSTRY—MANUFACTURES—COMMERCE.

A company, called the "Grant White-lead and Oil-works," has been incorporated at Memphis, Tenn. It has a chartered capital of $250,000; the principal business is to be the manufacture of cotton-seed oil.

The fourth annual fair of the State Agricultural Society of Mississippi will be held at the city of Holly Springs during four days in next Fall—from Oct. 16th to 20th.

Coal oil is employed on the western division of the Sunbury and Erie Railroad as a lubricator. For heavy bearings it is used pure; for light journals it is mixed with lard oil in the proportions of four of coal to six of the lard. No less than 109,000 gallons of it have been already used on this railroad.

The canal boat, *F. K. Jones*, from Oswego, N. Y., recently brought a load of 6,370 bushels of wheat through the Erie canal. This is the largest load ever brought by one boat. Its length is 76½ feet; breadth, 17⅛ feet.

The New York Central Railroad Company have placed 12 new cars on their track for the summer travel, each of which is furnished with arrangements to exclude all the dust.

The Hamilton (C. W.) City Council have contracted for the erection of a Crystal Palace for the exhibition of the Provincial Agricultural Association during the next Fall.

Messrs. Hazlett & Hobbs, of Pittsburgh, Pa., inform us that they are obtaining 16 barrels of oil per day from a well in Richie county, Va., and they are about sinking a number of others in the same oily locality.

New York is a great unfinished city. It is rapidly extending northward at an unprecedented rate. "Broadway," at the present time, is a remarkable scene of demolition and re-construction. The new buildings which are replacing the old ones are of imposing architecture, and it is estimated that, in this single street, the erection of the new edifices will cost about $6,000,000.

A bill has passed the House of Representatives, amending the steamboat law. It brings ferry-boats under the provisions of the Act of 1852; and a system of lights is prescribed for steamers and sailing vessels.

The California papers state that considerable quantities of rape-seed oil have been introduced into San Francisco from Japan, and several of them ask: "Cannot this oil be manufactured at home?" It can, and is a very excellent oil for burning in what are called the "French mechanical lamps."

The Boston *Commercial Bulletin* states that a New Bedford (Mass.) flour mill has just obtained two very large main belts for its use; they are each 140 feet long, 22 inches wide, double, and very heavy, requiring about 100 whole hides to make them, and cost nearly $1,100.

The gentleman is still alive (in his 92d year) who, in June, 1790, cut the first tree ever cut on the town plot of Gallipolis, Ohio. At that time there was a small settlement at Marietta and another at Cincinnati; the balance of Ohio was a wilderness; there were not, then, probably 1,000 white people in it altogether; now it contains near 2,500,000 inhabitants, and has been changed from a wilderness to one of the best agricultural States in the Union. Who ever before, in a single life, witnessed such a change?

In the village of Saxton's River, Vt., a large boot and shoe factory is now being completed. The work for all parts of the shoes is to be made in the factory, and principally by machinery of the best description and latest improvements, among which are to be two pegging machines, each capable of pegging 500 pairs of shoes per day.

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POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

[Reported expressly for the Scientific American.]

On Thursday evcning, May 31st, the usual weekly meeting of the Polytechnic Association was held at its room in the Cooper Institute, this city; Professor Mason presiding.

MISCELLANEOUS BUSINESS.

Refrigerators.—The "Polar Refrigerator" was exhibited, for keeping provisions cold and fresh in warm weather. This refrigerator has two provision chambers, separated from each other by a wedge-shaped ice-box. The ice is placed on a rack at the top of this box, and the water of the melted ice falls below on a filter; thus manufacturing ice-water for drinking and other purposes. The walls of the provision chambers are of sheet zinc, and the sides of the ice-box are corrugated, in order to give a greater cooling surface and strength.

The President—A good refrigerator is now an essential piece of apparatus in a well-furnished house. In hotels, the refrigerator becomes a good-sized room. At the Fifth-avenue Hotel, the refrigerator is a capacious apartment, constructed especially for the purpose, and with all the conveniences science could suggest. The marketing is done only once a week, everything being as surely preserved in summer as in winter. By such a system, the proprietor of that establishment was able, in one season, to save the entire amount of the first outlay on the room.

Working Steam Expansively.—Mr. Rowell gave further details of experiments now in progress at the Metropolitan Mills, which seemed to him to show that there was no advantage in working steam expansively. The club thought best to defer a discussion of the case until the experiments are completed. In all, there will be 20 trials, of 60 hours each in duration.

The president then announced the regular subject—"Gas-burning."

DISCUSSION.

In illustration of the subject, a great variety of gas-burners were exhibited by inventors and agents. Among these, the following were most worthy of notice:—Cole's burner, which is a tube to be slipped over the ordinary burner, the upper end of the tube terminating in a hollow sphere with a slit for the bat-wing flame or holes for the fish-tail flame. The inventor claims that, in this burner, the gas is highly heated before it issues. John Johnson's burner terminates above in a hollow vertical ring; the ring at the top is sawed through and a sliding valve, operated by a lever, fits into the saw-cut, and, by raising or lowering, closes the slit or adjusts it to the amount of gas to be used; this is believed to be the only burner which has a variable orifice. Thompson's "regulating burner" is provided at the bottom with a light hollow cone, which is raised by an excess of pressure; above the cone is a series of round weights resting on steps, which are successively lifted as the pressure becomes greater. This burner performed well. The burners which operate by simply checking the flow of gas by stuffing, &c., were also well represented.

Mr. Garvey, as the minority of the committee on "Johnson's Burner and Regulator Combined," read a report favorable to the invention. The report, at considerable length, opposed some of the positions of the majority, pronouncing them theories unscientific and absurd. Mr. Garvey finds the virtue of this burner in heating the gas before its issue.

The majority of the committee (Messrs. Seely and Hedrick) replied that they had not put their own theories, or theories of any kind, into the report; that the statements objected to were the unanimous teachings of the best authorities; that there was little advantage of the heating of gas before its issue (for the heating was at the expense of the flame); and that this burner was poorly constructed for conducting the heat down.

The discussion of these reports occupied a considerable time and was of a lively character, partly for the reason that there were a considerable number of persons present who were pecuniarily interested in the question of the utility of the burners concerned. The sentiment of the majority of the audience seemed to be unfavorable to stuffed burners, and to approve the conclusion of the majority of the committee, that there should be no check of flow of gas in the burner, unless of an automatic regulating power. Further account of the discussion of the reports is omitted for want of space.

The President—The light of sperm candles has always been more agreeable to me than the light of gas. Others agree with me in this choice; Professor Anthon, the celebrated classical scholar, has always preferred candle-light for study. The light of candles is yellowish, and similar to that of the economical gas flame. What is the reason or condition of the yellow light?

Professor Hedrick—Yellow light is produced at a lower temperature. Carbon, like other bodies when heated, passes through a series of colors, and at the highest temperature is "white hot." The white flame of gas is most intense; but the yellow flame of the same amount of gas is greater in quantity.

Dr. Van Der Weyde exhibited "Bunsen's burner," which is chiefly used by chemists for producing an intense heat. The common Bunsen burner is a gas jet, over which is placed a tube (open at the top), about six inches high and one-half inch in diameter; the tube terminates at the bottom in a foot, through which the gas passes to the inclosed jet. The lower part of the inclosing tube is pierced with three or four holes, about a quarter of an inch in diameter, for the supply of air to the gas. In this burner, the gas burns with a blue flame, giving no more light than alcohol; but if the air-holes be stopped, the light becomes whitish and smoky. When a large volume of heat is desired, two or more of these burners are combined on the same foot. The doctor also exhibited the gas blow-pipe by which the gas is burned from an annular aperture within which is an air jet. If oxygen be used instead of air, the most refractory substances—as platinum, for example—are melted with ease. The Bunsen burner and the gas blow-pipe are now in common use among chemists, and have taken the place of the spirit lamp and mouth blow-pipe wherever gas is convenient.

A gentleman in the audience here commenced addressing the club on the great merits of a method he had invented for economizing gas; but, on intimating that his method was a secret, and that he was unwilling to communicate anything of its nature, he was promptly requested by the president to take his seat. The president remarked that the club had no secrets, that the members came together to give and receive information, and that when a gentleman confessed that he had nothing to communicate he cannot be allowed to take up the time of the meeting.

Mr. Rowell—I once went to an expense of $40 to replace my ordinary burners by some highly recommended patent burners. My gas bills were increased 50 per cent.

Mr. Godwin—On my way to this meeting, I saw in a store in Fourth-avenue some of the Johnson burners in use, and inquired about them. The proprietor of the store believed they burned more gas than the old ones.

Gen. Hall—I have used the Johnson burner about two months; the light is agreeable, but an advantage of cost is little either way. The gas bill for April was larger than that for last year, and for May, nearly the same as last year.

Mr. Seely—A great objection to the stuffed burners, is that the liberty of re-adjusting the flow is taken away when a change is needed. If the burner is stuffed to suit the maximum pressure, when the pressure is lower, you will not have enough light, and you cannot get it. A stuffed burner is as unreasonable as a stop-cock which cannot be turned.

Lieut. Bartlett—The consumption of gas is rapidly increasing; as we grow older, we need more light. People are not at all satisfied with the amount of light which contented them 40 years ago. The consumption increases, and the bills increase; but we do not observe the connection between these facts. Mr. Roome, of the Manhattan Gas Company, says people complain more and more.

After appointing the subject for next week—"The Organization of the Club"—the association adjourned.

MESSRS. D. B. Dorsey & E. Matthers, of Fairmount, Va., have made certain improvements in type-setting (on which they have applied for a patent) which are worthy of notice. The principal object of their invention is to facilitate the handling of composed matter without danger of knocking it into "pi." To accomplish this object a permanent column galley is employed for setting up the type, and on this galley the type remains until they are distributed. Another very important feature in their invention is the employment of spring spaces, whereby the time and labor now spent in justifying lines is saved.

A COLUMN OF VARIETIES.

The fiber of a single silk cocoon is 1,520 feet in length.

The total length of railroads in Germany, at the close of 1859, was 7,949 miles.

Iron boiler tubes in a steamship rust out very fast when the vessel is laid up; they endure five times longer when in constant use.

The large iron pipes employed in the Glasgow (Scotland) Water-works are four feet in diameter, $1\frac{5}{8}$ of an inch thick, and sustain a pressure from about 300 feet of head.

The population of the world is now estimated at 1,279,000,000, viz.: Asia, 755,000,000; Europe, 272,000,000; Africa, 200,000,000; America, 50,000,000; Australia, 2,000,000.

Tamarack timber, treated with creosote and covered with felt, is introduced between the iron and stone work of the Victoria Bridge, in Montreal, to impart a certain degree of elasticity at the unction of these hard materials.

The Suez Canal, to unite the Red Sea with the Mediterranean, has been commenced at Port Said, where two large moles, running out nearly a mile into the sea, are being constructed. About 1,700 European workmen and several thousand natives are employed on the works.

In the Gulf of Manaar (Ceylon) turtle are frequently found of such a size as to measure five feet in length. Sir Emerson Tennant states that, in riding along the sea-shore one day, he saw a man in charge of some sheep, who was resting under the shade of a turtle shell which he had erected on sticks to shield him from the rays of the sun.

In England there are 300 silk manufactories, in which are 2,000,000 spindles and attendant machinery driven by engines amounting in the aggregate to 4,000 horse-power. About 7,000,000 lbs. of raw silk are imported into Great Britain annually. Few persons are aware of the amount of the English silk trade.

Cranberries may be profitably cultivated on swampy ground that would otherwise be useless. Solon Robinson states that, at Cape Cod, where the cranberry culture is carried to its fullest extent, swampy lands, that were worthless a few years ago, have now "a saleable value of $800 and $1,200 per acre."

Great quantities of what is called "patent fuel" are manufactured and employed in England, principally on steamships. It consists of the small or fine bituminous coal pressed into square blocks, and rendered adhesive by bitumen. It can be stowed away in less space than the shapeless lumps of common coal, and it is therefore preferable for long voyages.

In common engineering practice, the combustion of a pound of coal imparts to the water in a steam boiler about 10,000 units of heat, which is equal to the evaporation of 8 lbs. of water of ordinary temperature. In the laboratory 14 lbs. of water have been evaporated with one pound of coal.

Ten parts of tin, combined with one hundred of copper, form bronze, and is the usual composition for statues. Common bell-metal is composed of three parts of copper and one of tin. For very small bells, a small portion of zinc improves the tone. Speculum metal for telescopes is composed of equal parts of tin and copper. It is white, very hard and close in the grain, and receives an exquisite polish.

Sir Macdonald Stephenson writes to the London *Times*, describing a new mortar upon which he is now engaged: "It consists of the application of high pressure steam to produce great centrifugal velocity, and the angle of discharge of the shot or shell is regulated by simple mechanism. It can be kept in continuous operation by two men. The range varies from 800 to 2,000 yards, according to the velocity, angle of elevation, and dimensions of shot. Ten shots can be discharged for every single one of the ordinary mortar."

Dr. S. S. Blodgett, of Ogdensburgh, N. Y., writing to the *Dental Cosmos*, condemns the use of fine charcoal as a tooth powder. He asserts that it is as sharp as diamond dust, and soon wears off the enamel. He says:—"The great dentifrice that should be used at all times, and under all circumstances, is soap. Its alkaline properties serve to neutralize the acids contained in the fluids of the mouth, and its cleansing properties will correct the breath and remove offensive odor sooner than any article I have ever seen tried."

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IMPROVEMENT IN TURNING LATHES.

The manifest improvements which have been made of recent years in construction of American machinery are due in a very great measure to improved tools. Accuracy in the fitting-up and operation of every machine is dependent upon the tools employed to execute its various parts. Every improvement in tools, therefore, is a certain advance towards greater perfection in general mechanism, and is hailed by us with satisfaction. In such a spirit we present the accompanying illustrations and description of improvements in turning lathes, for which a patent was granted to Mr. William Sellers, of Philadelphia—the well-known tool manufacturer—on March 13, 1860.

Fig. 1 is a perspective view of the lathe, showing it applied with double slide-rest to dressing the tread of a pair of railroad car wheels, balanced on the axle. Fig. 2 is an end view of the lathe, with a vertical section of the poppet head; and Fig. 3 is a side section. Several objects are embraced in this invention. The first is: Arranging the head which supports the revolving spindle in such a manner as to enable it to occupy a shorter space on the bed, and the same time increase the stiffness. Second, To place the centers which carry the work to be operated upon in such a position with reference to the bed-piece, that the strain of the cut shall fall within the line of the bed whilst that side of the work opposite the cutting tool may project beyond the line of the bed; as by so doing, the width of the bed-piece is reduced to the narrowest possible limits without impairing the stability. Third, Constructing the bed-piece and the heads attached to it in such a manner that the parallelism of the axis of the spindles in every direction may depend upon the truth of two surfaces of the bed with corresponding surfaces on the heads. Fourth, Constructing the upper surface of lathe-beds in such a manner that the slide-rest may move only on one-half of it, the other half being of similar form, so that the slide-rest may be transferred upon it, thereby enabling it to work upon any part of any piece, the lathe being capable of swinging, and this arrangement permits the use of a smaller slide-rest with advantage.

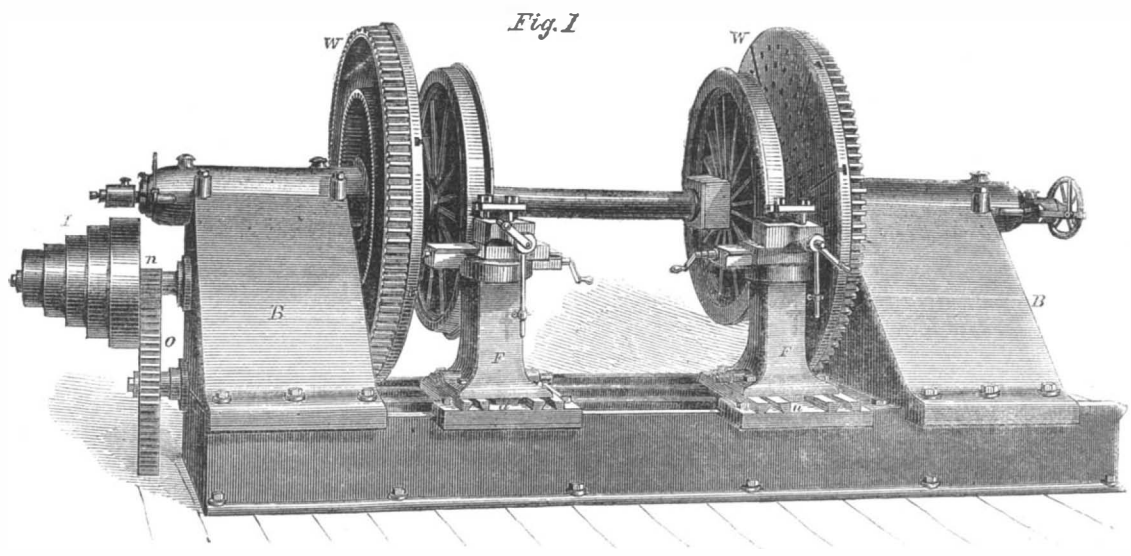

Fig. 1

SELLERS' IMPROVEMENT IN TURNING LATHES.

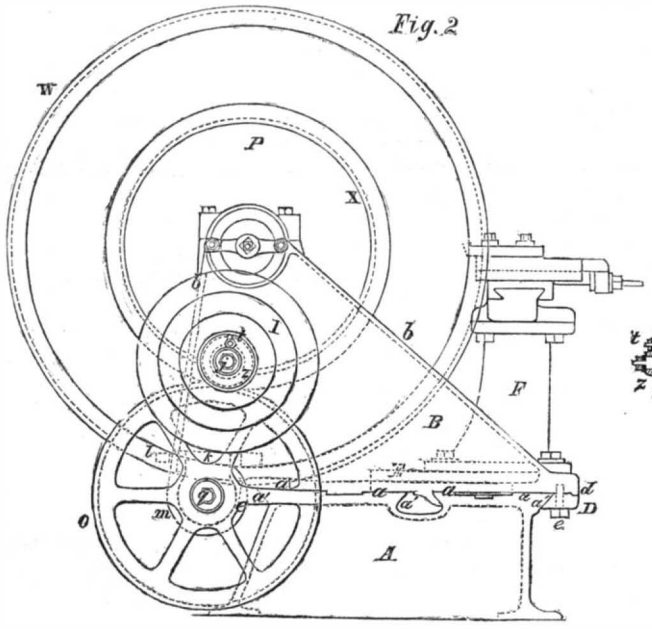

Fig. 2

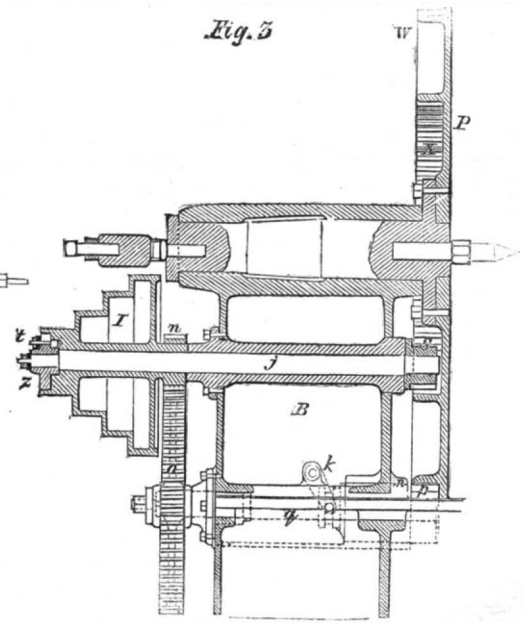

Fig. 3

The bed-piece, A, has its upper surface horizontal and divided longitudinally into equal similar parts, *a a*, the edges of which are finished at such an acute angle with the upper side as to answer purposes that we shall hereafter describe. B B are heads carrying the line spindles of the lathe, when fitted for turning both wheels at the same time. In order to give these the greatest amount of rigidity with the least possible quantity of metal, they are made in the form of a hollow box, having the front and back ends united together by the side webs, *b b*, Fig. 3, as far up as the center of the revolving spindle; while they entirely surround the spindle of the dead-head when the latter is fitted for turning one wheel at a time, thus greatly increasing the ability of the heads to resist the end thrust of any work that may be suspended on the centers to be operated upon. The heads are also enabled to be made shorter in the direction of the length of the bed than is possible by any of the methods in common use; the length of the bed is also diminished in the same proportion. In order to attach the heads, B B, to the bed-piece, A, a projection, C, Fig. 3, is provided and cast on the head, which corresponds with the side, *a'*, on the back of the bed-piece; and on the opposite side a piece, D, is provided, which is made to correspond with the adjoining edge of the bed on one side and to fit against and rest on a projection, *d*, of the head on the other. The piece, D, is attached to the head, B, by means of the bolt, *e e e*, and one side resting on the projection, *d*, and the other against the bed-piece, while the middle is clear of any support. By tightening the bolts, *e e e*, the head will be forced over on that side until the projection, C, will allow it to go no further, and as the sides, *a' a'*, are at an acute angle with the surfaces, *a a*, of the bed, the head will then be forced against the latter surfaces and held firmly in that position.

In turning with a single slide-rest and cutter, as only one side of the work can be operated upon, the axis of the lathe spindles is placed as far to one side of the bed as possible, allowing the part of the work opposite the cutting tool to be beyond the line of the bed. To keep the lathe steady, the axis of the spindles is not carried beyond the bed entirely—only so far as may permit the center of gravity of the whole to fall within the base of the bed, thereby making use of the whole upper surface of the bed for the slide-rest to move upon. In ordinary turning lathes, that part of the bed beyond the line of centers for the slide-rest is useless for this purpose. The bottom plate, E, of the slide-rest is attached to the bed-piece in the same manner as the heads, B B, but it only embraces one-half of the upper side of the bed (one of the surfaces, *a a*). The slide-rest may be transferred from one to the other of these—as they are both alike—according as the character of the work to be executed may require. The post, F, of the slide-rest is made capable of motion upon the bottom plate, E, in a direction at right angles to the bed-piece, A, for the purpose of adjusting the position of the cutting tool to the size of the work or article to be operated upon, and is moved by means of the pinion, T, gearing into rack, U; the bottom piece, E, is moved by means of a bar and rack in the bed-piece, A. P is the face-plate to which the work to be turned is attached. To giv it motion, it is provided with an external wheel, W, gearing with the pinion, *p*, Fig. 2. The latter is arranged so as to be placed out of or in gear with the wheel of the face-plate, by means of the clutch, *k*, which is operated by a wrench on the square end, *l*, of the clutch shaft, Fig. 3. The pinion, *p*, is driven by the shaft, *q*, Fig. 2, and it is fitted to slide on it easily. It is fitted to turn by a feather-key in the shaft; it is supported in position to gear with the wheel, W, by a projection, *m*, on the head, B. The outer end of shaft, *q*, has a gear wheel, O, upon it, which is driven by pinion, *n*, on a cone pulley, I. The latter turns freely on shaft, J, to which also it may be attached by the clutch-bolt, *t*, sliding in the plate, *z*, which is keyed fast on shaft, *j*. On the other end of this shaft is a pinion, S, which gears with the internal wheel, X, on the face-plate, P.

If the pinion, *p*, be placed out of gear with the external wheel, W, on the face-plate, P, and the clutch-bolt, *t*, be moved so as to attach the cone pulley, I, to the shaft, *j*, when the motion is communicated to the cone pulley the face-plate will be driven by the pinion, S. But if the clutch, *t*, be moved so that the cone pulley, I, shall be disengaged from the shaft, *j*, and the pinion, *p*, be placed in gear with the external wheel, W, on the plate, P, motion will be communicated to the latter through the pinion, *n*, wheel, *o*, shaft, *q*, and pinion, *p*; the pinion, S, and shaft, *j*, will thus be driven by the face-plate, which will have a slower motion than when driven by the pinion. The feeding of the cutting tool is accomplished by means of an eccentric on the on the end of each spindle, which works in the end of a slotted lever, thus giving the lever a reciprocating motion. These levers are connected to two small rockshafts overhead, and these again to the pawl wrenches shown on the slide-rest, by which arrangement an independent feed is given to each tool, and the amount of feed is determined by the position of the attachment on the pawl wrench and eccentric levers. The pawl wrenches can be placed on either screw of the slide-rest, so that we have a self-acting feed in every direction, and that without weakening the slide-rest by any internal arrangement of gearing. Beside the convenience in fitting-up the work by the combination of the internal and external wheel gearing on the same plate, the internal wheel, being cast with the plate, serves as a brace and renders it much stiffer than it would be without it.

Further information may be obtained by addressing Wm. Sellers & Co., Pennsylvania-avenue and Sixteenth-street, Philadelphia, Pa.

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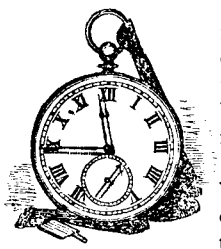
VOL. II., No. 25.....[NEW SERIES.]....*Fifteenth Year.*

NEW YORK, SATURDAY, JUNE 16, 1860.

WATCH MANUFACTURE.



UR fame as a clock-making nation is world-wide, for where can we travel—in Africa, Australia, India or China—that a Yankee clock is not to be found, reminding the inhabitants of "the land of steady habits." With regard to the manufacture of watches, we have also begun to do something creditable; still it is well-known that the *works* of nearly all the watches sold in the United States are imported from abroad. The manufacture of cases for them is carried on extensively in a few places, but they are only lids to foreign mechanism, while a great number of watches are imported entire. We are informed, upon reliable authority, that five times more watches are sold annually in North America, than in any other portion of the globe containing the same number of inhabitants. We ought therefore to be a punctual people, since we are so careful in our observations of "fleeting time." In 1857 —before the "panic"—we imported watches and their works to the value of $3,271,000; in 1858, the importation was valued at $2,207,000, but since that period this business has been very dull.

A very useful little book on this subject has lately been produced by H. F. Piaget, of this city, a practical watch maker of 40 years' experience. He commenced his efforts at fabricating watchwork in Switzerland, when he was only seven years old; he also made watches in London for several years and has followed the same craft for a considerable time in America, so that he can speak authoritatively on the subject. The whole operations of a watch are dependent upon the retractile elastic force of a coiled steel spring—that is its moving power. The operation of moving the hands on the dial regularly, to measure time are due to divices which control the coiled spring so as to permit it to "run down," with regularity. A train of small wheels, gearing into one another, receives motion from one wheel on the spindle of the main spring; and this gives the requisite number of revolutions to the time hands on the dial. A watch is a very simple machine, so far as it relates to the *principles* of its operation; but the construction of its parts and their arrangement call forth the highest exercise of mechanical skill.

The above-named author says that the English were really the first successful manufacturers of watches, and that "all the escapements applied to good ones, whether at home or abroad, were invented by them." The best of these are jeweled with rubies, the art of boring which (for pivot holes) was discoved by M. Fazio, of Geneva, in 1790. He could not get his invention adopted in Paris, however; so he then went to London where he was well received. Rubies are the hardest stones which can be drilled, and are therefore the best for pivots; but garnets and various other crystals are used for the more common sort of watches; the English and American ones have generally a diamond jewel set over the upper part of the balance.

The Swiss are the largest manufactures of watches in the world, and all the cheap showy varieties which are seen in jewelers' windows are principally of their manufacture. From recent statistics which we have examined the making of watches gives employment to 36,000 workmen in the Alpine Republic. England and Switzerland are the only countries which export their timekeepers to any great extent; those which come from the former are the most accurate in their movements; those from the latter are the neatest and cheapest, yet some of the Swiss watches have also a very high reputation as being accurate time-keepers. One of the very best and finely finished that ever M. Piaget saw had been made at Geneva, and was sent to California. The plates and bars for the wheels were of nickel, the wheels were of gold, it had a compensation ballance, an isochronal hair spring, and anchor escapement.

The opinion of an experienced and skilled artasan, as to the character of our American-made watches, is of great value. We are told by M. Piaget that "the American watch recommends itself for simplicity of construction, and it will be continually *improving* if the manufacture remains in the hands of persons who will make it of good quality without regard to the price." This is timely and appropriate advice; it is an injunction to strive for excellence rather than cheapness in such articles. The advice is particularly good, at this time, because very great efforts have of late years been made to produce cheap rather than good watches. When we consider that this country affords such an extensive market for foreign watches, it certainly opens a large field for those of domestic manufacture if they can be produced of equal quality at the same prices. This is a question for our people to solve. They have the natural mechanical genius to invent, and with patience and application they will finally succeed in this and in many other important branches of manufacture.

INDIA-RUBBER STRETCHED OUT AT LAST!

It is announced that Horace H. Day, the man who has so thoroughly stretched india-rubber thorough every phase of legal elasticity, has at last concluded to retire to the abodes of peace and happiness. No other man is so well known, in connection with the tortuous windings of rubber litigation, as Mr. Day; and what he does not know about this pliable article, and the law as applied to it, is scarcely worth knowing. He has proved himself a most obstinate and determined opponent, and when William Judson came into collision with him, then was verified the well-known saying:—

"When Greek meets Greek,
Then comes the tug of war!"

Mr. Day has sold out all his india-rubber patents, his factory estate at New Brunswick, N. J., and most of his goods, for a sum exceeding $500,000. The purchasers are William Judson, Conrad Poppenhusen and others, who have organized a new company with a capital of $600,000. All legal quarrels between the parties have ceased, and they have doubtless smoked the "pipe of peace" and buried "the hatchet of war" forever. We regard this result as most extraordinary, and feel somewhat amazed for the moment, as it looks just as though there was "an end to india-rubber," after all that has been said to the contrary. A few days ago we met Mr. Day dashing along the avenues of the Central Park, drawn by a splendid span of bays, in a style worthy of a prince; and not far behind him was his great competitor, William Judson—once enemies, now friends. We look upon this harmonious blending of antagonisms as one important step towards the millennium. Although lawyers may weep, we rejoice to see these gladiators bow down before the goddess *Concordia;* and we advise that each of these champions of caoutchouc be presented with a *belt* by the New York Belting and Packing Company.

FRIENDS OF THE SCIENTIFIC AMERICAN!—Do not forget that the next number closes this volume. Nearly 10,000 subscriptions expire at this time, but we confidently expect that they will be all renewed, and not only this, but that all our subscribers will add to our subscription list by sending new names with their own. We have never appealed in vain to our readers; and every year re-assures us that the SCIENTIFIC AMERICAN has a host of substantial friends in every State of the Union. We hope to have before the first of September, a circulation numbering at least 40,000 copies. The SCIENTIFIC AMERICAN is sold largely by local agents, and its friends can aid its circulation very materially by getting their neighbors to take it from the agent. According to a long-established rule (which is inflexibly applied to all), we discontinue sending the paper when the subscription expires; subscribers are thus protected against receiving a paper whenever they do not want it continued. It should also be borne in mind that we do not employ traveling agents; we prefer to rely upon the true friends of the paper.

THE ANATOMY OF THE STEAM ENGINE.

It is not essential to the caption of this article or to our present purpose to enter upon a review of the steam engine constructed through so many years as have elapsed since its invention, or through what slow, though steadily advancing steps, from a rough and imperfect machine, it has become the very king of all motors. The rather do we remark upon the imperfections which still exist, and treat upon their removal. These faults are confined to no one section of the country, but prevail in a greater or less degree everywhere—they prevent the engine from reaching its proper sphere, and from exercising that power which the area of its piston would legitimately give it.

Every machinist and engineer is well aware of the advantage to be derived from close-fitting boxes (where they should be so) and from surfaces "out of wind," and the like technicalities; and knowing it as they do, it is injurious to the reputation of any concern to allow its work to go from it in a careless and slovenly manner. It has come within our province to remark many times upon the want of *practical* knowledge displayed in the manufacturing of engines, both as respects the convenience of the design and the proper proportions of the same. If we take the matter of metallic packing for pistons, as generally made, we shall find that, even in cylinders of so small diameter as 12 or 15 inches, the two thicknesses of metal that comprise both the inner and outer rings amount (with but few exceptions) to one inch and an eighth. Now, we would ask where the steel spring is which will set these rings out to the cylinder as they wear, or in fact, what mechanical device or process will do it? It is, of course, easy to do it by set screws and springs, but packing so made is not properly constructed, if it be only from the very large margin it leaves for ignorance and recklessness to damage a great deal of property. In our largest ocean steamers the rings seldom exceed half an inch in thickness (separately), and the packing is insured absolutely steam-tight by springs not over 3-16ths at the middle, and swaged down to an edge at the ends—this in cylinders of six and seven feet in diameter. By what argument, therefore, can we reconcile ourselves to the use of packing in a cylinder which would be suitable for one ten times its size? These are common faults, and we have seen many weary hours of labor expended in efforts to make these clumsy pistons steam-tight. We assert that in engines of from six to two hundred horse-power, the rings do not require to be one-half their present thickness, in their relation to fuel, the wear and tear of material and in a percentum upon the duty done by the engine. All these enter into the account. It would certainly lessen the weight of the piston, which, in a horizontal engine, being always resting on the bottom, is a matter of no small moment. A piston which cannot be made steam-tight by *shoving* in the springs, not driving, is a faulty one, and absorbs power and works to a disadvantage.

In the slide valve, which is the very heart and center of the giant's system, there is the same want of practical knowledge displayed. In too many instances we find a mere nothing in respect to *lead* and *lap*, and a choking of the exhaust ports, which makes it a matter of wonder how the engine ever gets past its center. Let us take any ordinary valve and continue the width of its face across it by means of a square, and afterward mark them outside with a center punch; if we perform the same operation with respect to the ports of the cylinder, and having done so, return the valve to its seat and set it with the proper lead (which differs in different work), we shall find that, in numberless cases, the exhaust does not open until the piston has commenced its return stroke some inch or more, thereby causing compression of steam and a needless obstruction and resistance. It is the practice with many engineers to delay the closing of the exhaust till the latest possible moment, in order to retain sufficient steam to fill the ports and waste passages. We regard this as a hobby, and not sustained by proof of value. Moreover, the exhaust steam does not wait to be punched out by the piston in a properly-made valve, but releases itself through the slightest opening, leaving the piston in a comparative vacuum. If this were not the case, instead of the present puff, we should have a long wheezy sound. It is a very easy matter to put a sliding cover on two ports, so that they shall open and close alternately; but a valve which shall work with economy to the engine, requires careful study. Also in respect to

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weight and unnecessary width of surface, many ar. wanting. With the different forms of regulator in use, where so many are excellent, it is invidious to particularize; but in the old-fashioned two-ball governor, which many yet adhere to, there are details which seem trivial and yet are not so. If we look at it, we find in all six joints and pins, whose friction is to be overcome before the valve can be moved. Suppose the machine in operation and these arms revolving, we find that the weight of the balls and the resistance of the atmosphere are continually throwing the faces of the joints against each other, and, in a word, doing all it can to jam them fast. All these joints and pins are fitted tight; consequently, from the very motion of the thing, the apparatus is half the time inoperative. The motion of the arms which move the sliding collar on the shaft is not at right angles and direct, but diagonal, and consequently slow. A properly constructed governor, according to our theory, consists of but four joints; these have no faces, but swing on hardened steel centers, whereby the friction is reduced to the lowest possible point. The arms are at right angles with the shaft, the balls hang vertically and the action of the centrifugal force is positive. With such a governor the speed can be maintained to a nicety, on account of its lessened friction, the extreme sensitiveness with which it acts and the correct principles involved in its construction. This detail of an engine, from its duty, requires to be as delicately made as possible, or else we shall find the engine varying in speed every minute. And we submit that if an engine, or any machine, be worth making at all, it is worth doing as well as the resources of the age will admit. Absolute accuracy goes far to insure perfection, where the general details and design of an engine or machine are faulty · and it is a source of pride to a maker when he can point to the product of his skill and capital, and say that the cost of repair, considered by the amount of duty done, has been infinitessimal.

WEEKLY SUMMARY OF INVENTIONS.

SILVERING LEAD TUBING.

Many attempts have been hitherto made to silver the interior of lead and other tubing employed in mineral water apparatus and for other purposes, by the voltaic process, but it has hitherto been found impossible to effect a uniform deposition of the silver throughout the whole length, or even to obtain any deposition beyond a short distance from the ends of the tubing. The object of this invention is to obtain by such process a uniform deposition of the silver on every part of the interior of a piece of tubing of any length, and to this end the invention consists in the employment as the bath or decomposition cell of the tube itself; also in the use, for the purpose of conducting the galvanic current and for replenishing the supply of the coating metal, of a rod or wire passing through the tube in the direction of its length; also in the extension or stretching of the tube and central conductor by means of screw threads and nuts, or their equivalents attached to their ends, for the purpose of keeping them straight, and thereby providing for the more ready insertion of the central conductor within the tube, and for the prevention of metallic contact; also in the use of non-conducting supports between the interior of the tube and the exterior of the central conductor, for the purpose of preventing the conductor coming in contact with the tube, and preserving a uniform distance between them in all parts; also in providing for the movement of the central conductor and its non-conducting supports within the tube to permit the deposition of the metal on all parts of the interior of the lead pipe, which could not take place if the supports were stationary; and lastly in connecting the poles of the battery at opposite ends of the tube and central conductor to insure uniformity of deposit throughout the whole length of the tube. The inventor of this improvement is John Matthews, Jr., of this city.

SEWING MACHINE.

One part of this invention relates to the feeding apparatus, and is an improvement in that kind of feeding apparatus sometimes termed the "four motion" feed. In this feed the dog rises from below the surface of the work-plate to bite the cloth or other material before advancing to move it, and descends to release the material before it moves back preparatory to the repetition of its operation. To effect this movement the dog has been heretofore generally, if not always, raised to bite the material with a positive movement effected by a cam or its equivalent, and has been generally depressed to release the material by its own weight or by the elasticity of a spring, to which it has hitherto been attached. This improvement consists in the employment of a spring to force the dog upward to make it bite, in combination with a cam to depress it to liberate the material, by which simple change some very important results are obtained, as will be easily understood. It also embraces certain means of withdrawing the dog from the material at the pleasure of the operator, to admit of the material being moved or for any other purpose, as well while the needle is out of, as while it is in the material. Another part of the invention consists in a novel arrangement of a hook to operate in combination with a needle and a reciprocating shuttle, interlocking the thread so as to form a half-knot, thus making a secure stitch. This device has been patented to Charles Scofield, of Adams, N. Y., and Clark Rice, of Watertown, in the same State.

CUT-OFF.

This invention relates to the employment as a cut-off, in combination with a slide valve or valves by which the induction and eduction of steam to and from the cylinder of the engine are effected, of two puppet valves, applied to seats provided for them in the ports of the slide valve or valves; and it consists in certain means of opening the said puppet valves at the proper time for the induction of the steam and of keeping them open as long as desired within the first half of the stroke of the piston, and then tripping them, and permitting them to close and cut-off the steam, the whole being arranged within the steam chest of the engine and operated by the movement of the slide valve, but made variable under the control of hand gear applied outside of the steam chest or of a governor. This improvement was designed by David Fellenbaum, of Lancaster, Pa.

BRIDLE BIT.

The object of this invention is to place the horse, especially a vicious one, under the better control of the rider or driver than it has hitherto been, and with the use of but a single pair of reins. The ordinary bar bits are frequently rendered inefficient in consequence of the animal grasping the bar with his teeth, and thereby preventing the action of the bit on the horses' jaw. The invention consists in the use of supplemental bars placed within the principal one, and having springs attached, the parts being so arranged as to adjust the action of the supplemental bars on the lower jaw of the animal in case of the latter grasping with its teeth the principal bar. The patentee of this invention is Henry Crane, of this city.

TEMPERING SPRINGS AND OTHER ARTICLES.

The object of this invention is to not only facilitate the manufacture of tempered steel articles, but also to temper the same in a better manner than heretofore. The invention is applicable to the manufacture of tempered steel articles which require to be bent or swaged in a particular form and tempered. The invention consists in applying water to the article to be tempered, while the latter is under pressure, and while being confined within a swage or die, and under the same heat in which it was formed or bent. The inventors of this improvement are C. G. and H. M. Plympton, of Walpole, Mass.

BARK SEPARATOR.

This invention has for its object the separating of the good from the worthless portions of bark, preparatory to the grinding of the former for the use of tanners. It is designed to have the invention applied to a bark mill in such a way that the separated superior portions of the bark may pass directly into the mill and be ground, the worthless portion dropping from the machine, while the portions of medium quality are reduced to dust by the action of the saw or cutter, separated from the other portions and discharged from the machine at a separate point. This device has been patented to Joseph Brakeley, of this city.

BAROMETERS.

The object of this invention is to make a mercurial barometer that shall be perfectly portable and free from liability to breakage in transportation. The invention consists in a certain mode of applying a valve in combination with a cistern surrounding the lower end of the tube, to provide for the closing of the lower end of the tube to keep it full of mercury, and thereby to exclude the air when it is desired to transport the barometer. The credit of this contrivance is due to Lum Woodruff, of Ann Arbor, Mich.

OUR SPECIAL SOUTHERN CORRESPONDENCE.

One of the assistant-editors of this journal has gone on a rapid trip down the Mississippi, as far as New Orleans, and will thence proceed to Galveston, Texas, visiting some interior portions of the State. During his absence he will furnish us with a weekly letter upon such topics as he may deem of interest to our readers. The first letter appears in this week's issue, and we expect soon to receive from his pen some account of the rise and progress of the cotton-seed oil business (which is now so rapidly assuming importance) and other industries of the southern States.

PURE BENZOLE FROM COAL NAPHTHA.—The sulphite of phenyle and ammonium ($C^{12} H^5 NH^4 2 SO^3$) usually called sulphobenzolate of ammonium, yields a very large proportion of pure benzole when submitted to dry distillation. The hydro-carbon thus procured can hardly be distinguished from the benzole obtained by heating benzoic acid with lime. Its odor is etherial, almost fragrant; and its boiling point is constant at 80°8. A chemists well acquainted with the ordinary benzole obtained from coal naphtha, to whom I showed a specimen of the benzole thus prepared from the sulphobenzolate of ammonium, scarcely recognized it as the same substance, so pleasant was its color. To prepare the sulphobenzolate, the purified benzole of commerce is dissolved with the aid of a gentle heat, in a slight excess of fuming sulphuric acid; if ordinary oil of vitriol be employed, a much larger quantity of the acid is required. The acid liquid, after having been heated in the water-bath for some time, is allowed to cool, and then diluted with water. Commercial carbonate of ammonium, together with some ammonia water, is to be added till the solution is slightly alkaline. The whole is now evaporated to dryness in the water-bath, and the dry mass exhausted with boiling alcohol. The greater part of the sulphate of ammonium remains in the residue. The alcoholic solution of the sulphobenzolate of ammonium is to be transferred to a retort, and submitted to distillation. When all the alcohol has distilled over, the receiver is changed, and the heat raised. The benzole which collects in the receiver is accompanied by small quantities of solid products and by water. From these it may be separated by the addition of a strong potash solution, and the removal of the supernatant oil by the pipette. The benzole is then rectified off caustic potash. The benzole thus produced is perfectly pure, and although the quantity obtained is not very large, yet the result of the process is exceedingly interesting to the chemist, since it removes all doubt concerning the identity of the benzole from coal naphtha and similar sources with that obtained from benzoic acid.—*Chemical News.*

INTRODUCTION OF FIRE-ESCAPES.—The fire-escape imported from London by some gentlemen in this city, and constructed upon the plan illustrated on page 244 of the present volume, has been tested and promises to give good satisfaction. Messrs. Mickle & Carville, who, some months ago, patented (through the Scientific American Patent Agency) a fire-escape, which was illustrated on page 260 of the present volume, have been awarded $20.000 by the Common Council, to introduce their invention into the city.

INCREASE OF INVENTIONS AT THE SOUTH.—We have lately noticed a marked increase in the number of applications for patents from the southern States. Our receipts of money on account of patent business, published weekly, bears testimony to this fact. The activity of the inventors augers well for the prosperity of any section of the country.

STEEL DIES.—On another page will be found the advertisement of W. K. Lamphear & Co., of Cincinnati, Ohio, manufacturers of hand-made tools. We have examined specimens of their steel dies, which appear to be of the first quality, and of that character which first-class workmen use.

PATENTS FOR NEW INVENTIONS.—All persons who are interested in procuring Letters Patent for new inventions are invited to read the advertisement of MUNN & CO. (in this number), who, in connection with JUDGE MASON, late *Commissioner of Patents*, attend to every branch of this business.

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THE RISE AND PROGRESS OF INVENTIONS.

ADVICE TO INVENTORS.

During the period of Fourteen Years which has elapsed since the business of procuring patents for inventors was commenced by MUNN & Co., in connection with the publication of this paper, the number of applications for patents in this country and abroad has yearly increased until the number of patents issued at the United States Patent Office last year (1859) amounted to 4,538; while the number granted in the year 1845—fourteen years ago—numbered 502—only about one-third as many as were granted to our own clients last year; there being patented, through the Scientific American Patent Agency, 1,440 during the year 1859. The increasing activity among inventors has largely augmented the number of agencies for transacting such business; and at this time there is scarcely a town of 4,000 inhabitants, but has its patent agent, patent lawyer, patent solicitor, or patent attorney, all of which terms are used to convey the same idea—viz., that their services are offered to the inventor or patentee for a pecuniary consideration.

In this profession, the publishers of this paper have become identified with the universal brotherhood of Inventors and Patentees at home and abroad, at the North and the South; and with the increased activity of these men of genius we have kept apace up to this time, when we find ourselves transacting a larger business in this profession than any other firm in the world. Year after year, we have increased our facilities for transacting patent business, by gathering around us a large corps of the most eminent engineers, draughtsmen and specification writers that can be procured. Among these gentlemen are those who have been connected with the United States and Foreign Patent Offices. The latest engagement we have made is the association with us of Hon. Charles Mason formerly COMMISSIONER OF PATENTS, and favorably known to the inventor as their friend and advocate. The memory of his acts while holding this high position will be cherished by many an honest inventor with gratitude as long as he lives.

The arrangement made with Judge MASON renders our facilities for prosecuting all kinds of patent business complete, however ample they were before; and without being accused of egotism, we may safely assert that no concern has the combined talent and facilities that we possess for carefully and correctly preparing applications for patents, and attending to all business pertaining to patents, such as Extensions, Appeals before the United States Court, Interferences, Opinions relative to Infringements, &c.

Persons having conceived an idea which they think may be patentable are advised to make a sketch or model of their invention, and submit to us, with a full description, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh streets, Washington, by experienced and competent persons, under the direction of a gentleman who has spent a lifetime about the Patent Office. Over 1,500 of these examinations were made last year through this office, and as a measure of prudence and economy, we usually advise inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared on reasonable terms, by sending a sketch and description of the invention. The government fee for a caveat is $20. A pamphlet of advice regarding applications for patents and caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the government fee, by express. The express charges should be prepaid. Small models, from a distance, can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park-row, New York.

REJECTED APPLICATIONS.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, enclosing the official letters, &c.

FOREIGN PATENTS.

We are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business we have offices at Nos. 66 Chancery Lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that three-fourths of all the European patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through our Agency the requirements of the different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our branch offices.

INTERFERENCES.

We offer our services to examine witnesses in cases of interference, to prepare arguments, and appear before the Commissioner of Patents, or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "Hints to Inventors." Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Many persons have been ruined from adopting the "penny-wise and pound-foolish" maxim, when an investment of a few dollars, to have been informed of their rights, would have saved them much anxiety and money. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. Judge MASON assists in all examinations of this kind.

For further particulars, address MUNN & CO., No. 37 Park-row, New York.

EXTENSIONS OF PATENTS.

Valuable patents are annually expiring, which might be extended, and bring fortunes to the households of many a poor inventor or his family. During the past fourteen years, we have had much experience in procuring the extension of patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we never lost but two cases—and those were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to ensure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased patentee may apply for an extension. Parties should arrange for application for an extension at least six months before the expiration of the patent.

For further information, as to terms and mode of proceedure in obtaining an extension, address MUNN & CO., No. 37 Park-row New York.

ASSIGNMENT OF PATENTS.

The assignment of patents and agreements, between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

PATENT CLAIMS.

Persons desiring the claims of any invention which has been patented within 14 years can obtain a copy by addressing a note to this office, stating the name of the patentee, and date of patent when known, and enclosing $1 as fee for copying. Address MUNN & CO., No. 37 Park-row, New York.

CAUTION TO INVENTORS.

Messrs. MUNN & CO. wish it to be distinctly understood that they neither buy nor sell patents. They regard it as inconsistent with proper management of the interests and claims of inventors, to participate in the least apparent speculation in the rights of patentees. They would also advise patentees to be extremely cautious into whose hands they entrust the power to dispose of their inventions. Nearly fifteen years' observation has convinced us that that the selling of patents cannot be conducted by the same parties who solicit them for others, without causing distrust.

BUSINESS CONDUCTED CONFIDENTIALLY.

We would inform inventors that their communications are treated with the utmost confidence, and that the secrets of inventors confided to us are never divulged, without an order from the inventor or his acknowledged representative.

TESTIMONIALS.

The annexed letters, from the last three Commissioners of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very satisfying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Messrs. MUNN & Co.:—Gentlemen: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING JUNE 5, 1860.

[Reported Officially for the SCIENTIFIC AMERICAN.]

. Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN New York.

28,544.—P. W. Adaire, of Hays' Creek, Miss., for an Improvement in Ditching Machines:

I claim the combination of the frame, A, and adjustable standards, E E, with wheel, B, circular cutting plates, a a, cross-pieces, b b, false bottoms, c, guide pieces, e', cams, C' C', guide or shield, B', plow, I, and openers, H, arranged and operating in relation to each other as and for the purposes set forth.

28,545.—M. C. Andrews, of Lawrence, Mass., for an Improvement in Swinging Bolsters for Railroad Car Trucks:

I claim the combination of the friction blocks with the truck frame, the swinging bolster and its pendulous links—the same being for the purpose described.

I also claim the application of the elastic step to the bolster, in connection with so constructing the bolster that it may be capable of springing together, substantially in manner and for the purpose as described.

28,546.—W. J. Andrews, of Columbia, Tenn., for an Improved Sad-iron Heater:

I claim the described rack for sad-iron heaters constructed and operating in the manner substantially as described.

[This invention consists in constructing a rack of hollow metal tubes, of a suitable strength, and arranged in such a manner that the tubes will serve to hang the rack to the top bar of an ordinary grate, and to conduct hot air through them from the fire, and give out heat to the iron or irons that are placed on the rack, independently of the direct heat the bottoms of the irons receive from the fire; and in combining with such a rack a guard plate for protecting the iron from burning or being smoked.]

28,547.—John Armour, of Helena, Ark., for an Improvement in Sharpening Saws:

I claim forming a narrow slit from the bottom of the notch in the spreader and sharpener, B, into the body of the same, and then bringing the sides of said slit into close contact with each other before tempering the said spreader and sharpener, substantially in the manner and for the purpose set forth.

I also claim combining the spreader and sharpener, B, with the hand block, A, when the adjustable segment, C, is combined with said block substantially in the manner and for the purpose set forth.

28,548.—T. G. Arold, of New York City, for an Improvement in Drop Light Joints:

I claim, first, The construction of the socket of a drop light joint of a single piece, substantially as described.

Second, The employment, in combination with the socket, A, of a drop light joint for gas-burners, made in one piece, and the elastic lining, d, of a screw ring, e, fitted to a screw thread inside of the said socket substantially as and for the purpose specified.

[This invention consists in a certain construction of the socket of the joint and in a certain mode of applying the lining of cork or other elastic material, whereby provision is made for the contraction or renewal of the said lining when its opening becomes worn by friction or enlarged by the heat of the burner to which it is applied, or for adapting it to variations in the sizes of burners.]

28,549.—E. H. Ashcroft, of Boston, Mass., for an Improvement in Apparatuses for Naphthalizing Gases:

I claim the combination of the gas-receiving and expanding chamber, F, with the naphthalizing cistern, scroll and float, as specified.

Also, the above-described arrangement and application of the float, scroll and disk, whereby they are rendered capable of easy and proper adjustment, as explained.

Also, the combination of one or more propelling wings or the equivalent thereof with the scroll and float, when applied and used within a cistern substantially in manner and for the purpose as described—such propelling devices being to facilitate or effect the rotation of the said float and scroll while being buoyed within the liquid, as described.

Also, the application and arrangement of the foraminous diaphragm with respect to the cistern and eduction pipe of the apparatus as described.

28,550.—Cyrus Avery, of Tunkhannock, Pa., for an Improvement in Gearing for Horse-powers:

I claim, first, Constructing the main wheel, C, in the form of a cone, and each section with a narrow periphery, the teeth on the lower intermediate wheels, A A A, running under a part of the main wheel, C, which is smaller than the part which they take into, following the same arrangement up to any number desired, the upper series held down by the top or cover, D—the whole constructed and working as specified.

Second, The peculiar corstruction, combination and operation of the intermediate wheels, b b b, and the main wheel, C, and the center pinion, Fig. 7, both when at rest and in motion, substantially as specified above.

Third, The manner in which the main shaft is held in position, namely, by the intermediate wheels taking into the main wheel and into the center pinion, thus enabling me to dispense with all bearings except the stepping.

Fourth, The manner of seating the driver, namely, putting a post through the cover and main shaft into the step and a seat on top of this post, that will revolve or stand stationary, at the driver's pleasure.

Fifth, Giving the band wheel, K, an increased velocity of one revolution over and above the velocity imparted by the tumbling shaft, M, by means of the cogged or millied stationary concave wheel or ring, N, Fig. 8, one or more intermediate wheels, Fig. 8, revolving on their own axis and the center pinion wheel, L, Fig. 9.

Sixth, Having one end of the band wheel shaft in the end of the tumbling rod, and revolving the same way.

Seventh, Having the whole machine shut up tight by the way it is constructed without boxing.

28,551.—W. B. Avery, of Cambridge, Mass., for a Fire-escape:

I claim the combination and arrangement with a grapple constructed with pivoted holding dogs, o o, of the reels, E and I, when these latter are hung by a shaft, s, in links, g, adjustable in position as described, and provided with a crank chain, c, and brakes—all operating to regulate and control the position and descent of the car, d, substantially as described.

28,552.—Leopold Bennett, of Pittsburgh, Pa., for an Improved Steam Valve:

I claim the construction of a valve oscillating or working in the same manner as a cock, with the steam passage traversely through it and the exhaust through it in the direction of its length, as in the manner described by reference and drawings; my object being to relieve the steam valve as far as possible from unnecessary friction. The valve can be worked by any ordinary eccentric or cam, or any of the usual appliances for working slide or poppet valves.

28,553.—Joel Bowman, of Somerset, Ohio, for an Improvement in Machines for Dressing Millstones:

I claim the application to the lever, G, of the graduating device consisting of rocking bar, n, with arms, q, connected with sliding frame, t x, in combination with springs, p and v; the arrangement and operation being substantially as set forth.

28,554.—Joseph Brakely, of New York City, for an Improvement in Machines for Separating the Qualities of Bark:

I claim the combination of a saw or cutter, D, rotary or reciprocating, a pressure roller, L, and adjustable bearing plate, O, with or without rollers, Q—all being arranged and applied to a bark mill substantially as and for the purpose set forth.

28,555.—Henry Brandt, of Columbia, Pa., for an Improvement in Bending Teeth for Horse Rakes:

I claim the bender, A, with its flange, B, raised end, G, guides, E D, pivot, F, and braces, C e e, in combination with the flanged and grooved curved lever, K L M N, made substantially as set forth, for the purpose specified.

28,556.—G. C. Brower, of New Orleans, La., for an Improvement in Gas Torches:

I claim a gas torch constructed substantially as described and represented.

28,557.—Robert Bryson, of Schenectady, N. Y., for an Improvement in Harvesters:

I claim the combination of the finger bar having a bracket, K, and axial cross head, c, with the socket plate, L, of the frame, A; the whole constructed and arranged and operating in the manner and for the purpose described.

[This invention consists, 1st. In a peculiar arrangement of gearing for communicating motion from the sickle, whereby a machine of light draft is obtained, and the power applied to the sickle in a very direct manner. 2d. In a novel arrangement of the pitman, by which the same may be extended or shortened as occasion may require. 3d. In a peculiar manner of attaching the finger-bar to the main frame of the machine, whereby the sickle is allowed to conform perfectly to the inequalities of the surface of the ground. 4th. In an adjustable driver's seat to admit of the adjustment of the weight of the driver on the machine, as circumstances may require.]

28,558.—T. V. Bush, of Gallatin, Tenn., for an Improvement in Houses for Preserving Roots:

I claim, in combination with the outer walls and covering, a series of inner compartments, which inner compartments are surrounded by and covered over with dry earth as a filtering medium between the roots and the external air, for the purpose of storing and preserving said roots, substantially in the manner described.

28,559.—D. H. Chamberlain, of West Roxbury, Mass., for an Improved Feed for Leather-splitting Machines:

I claim, in combination with a rigid feed roll, B, the presser roll composed of independent disks or sections, d, confined in a suitable receptacle or trough, E, and pressed towards the roll, B, by pressure applied independently to each disk, substantially as described for the purpose specified.

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28,560.—S. G. Cheever, of Boston, Mass., for an Improvement in Machines for Mixing Paints:

I claim the arrangement of the collars which hold and move the mixers or beaters, in their relation to each other, and the actuating parts, so that while the middle series move in one direction the outer and inner series shall move in the other, in combination with the central curved blades attached to the central shaft—all moving and operating substantially as set forth.

28,561.—S. A. Clapp, of Hamilton, Ill., for an Improvement in Machines for Packing Flour:

I claim the combination of spring ring or short cylinder, o, with hooks, m, an inner cylinder, l, a frame, h s, and upright rods, h, for the purpose of expanding the upper end of the sack turning and twisting while being packed, substantially as set forth.

28,562.—S. P. Cobb, of South Danvers, Mass., for an Improved Machine for Finishing Leather:

I claim, in combination with the tool and the vibrator, a mechanism substantially as described, by which, while the vibrator may be at rest, or nearly so, the angular position of the finishing tool relatively to the bed may be varied as described—such mechanism being the tilting plate, b, and its sectoral lever, i, and click applied to the vibrator and operated by a hand lever, as specified.

And, in combination with the tilting plate, b, or tool-holder and the vibrator, D, I claim a mechanism, substantially as described, by which, while the vibrator may be in motion, the tilting plate may be moved on its fulcrum so as to change its angle with the bed—such mechanism being the slider, o, and the slotted lever, I, applied to the vibrator, the arm, n, and the frame of the machine in manner and so as to operate substantially as explained.

I also claim the combination and arrangement of the four cams, K L M N, their connections and operating screws, the same being for the purposes as specified.

28,563.—Henry Crane, of New York City, for an Improved Bridle Bit:

I claim the combination of the bars, A C C, the latter being fitted with the bar, A, connected by a joint, a, at their inner ends and having a spring, F, attached substantially as shown and described for the purposes specified.

28,564.—John Dickson, Jr., of Brooklyn, N. Y., for an Improvement in Hat Conformatures:

I claim, in combination with the hat conformature constructed as described, the sizer, f, formed of two metallic strips connected to the ends of one of the extension bands, e, to measure the size of hat, regardless of the shape, at the same time that said shape is taken by said conformature, as specified.

28,565.—T. S. Disston, of Philadelphia, Pa., for an Improved Machine for Making Tabs for Cross-cut Saws:

I claim, first, The box, P, its dies, N and N', the movable pin, L, and the pressure bar, m—the whole constructed, arranged and operated as and for the purpose set forth.

Second, In combination with the above, the plate, R, with its cutting projections arranged in respect to box, P, as described.

Third, The bar, W, with its projection, x, in combination with the pin, L, and its projection, e, and the inclined bar, g, the said bar, W, being operated by the appliances described or their equivalents, and the whole being arranged for joint action substantially as specified.

Fourth, The slide, M, its levers, f and f', and their projections, h and i, in combination with the orifices in the slide, K, and the stationary inclined bars, j j; the whole being arranged and operating substantially as and for the purpose set forth.

28,566.—Henry Ehrman, J. H. Ehrman and H. H. Ehrman, of Annville, Pa., for an Improved Washing Machine:

We claim the combination of the journal boxes or bearings, B B, with the concave, E, springs, d, and rods, D, as shown and described, so that the said bearings, rubbing cylinder, concave and springs may be all simultaneously removed, as set forth.

[This invention relates to an improvement in that class of clothes-washing machines in which a rotating, corrugated cylinder is used in connection with a yielding, corrugated concave placed within a suitable box. It consists in having the bearings of the rotating, corrugated cylinder connected to the concave by springs and rods, whereby said parts may be readily fitted into and removed from the box, and the latter rendered serviceable, when required, for rinsing and other necessary and useful purposes.]

28,567.—H. C. Fairchild, of Brooklyn, N. Y., for an Improvement in Seed Planters:

I claim the partition, F, introduced in the cylinder, A, for separating the seed, in combination with the plates, G G' and G'', the plate, G, being provided with projecting lugs, i, forming a channel for dropping the pumpkin seed as the plate is semi-rotated; the whole being arranged and operating simultaneously with the plunger, C, as and for the purposes set forth.

[This invention consists in dividing a cylindrical seed box in two compartments by a partition, for holding the different seeds and keeping them separated; and in connection with this, it consists in a novel seed-distributing device operated by a semi-rotating movement and arranged in such a manner as to effect the desired object in a superior style.]

28,568.—J. M. Fish, of Buffalo, N. Y., for an Improvement in Machines for Weighing and Bagging Grain:

I claim the arrangement of the bin, A, doubly-inclined floor, O, vertical gates, D, spouts, L, frame, B, and scale, L; the whole being constructed and combined substantially in the manner and for the purposes explained.

28,569.—E. L. Foote, of Springfield, Ill., for an Improvement in Rock Drills:

I claim, first, The combination of the heads, v, with the stop guides, e, cams, I, and the drill bars, F, when the whole is constructed and arranged substantially as described.

Second, In combination with the drill bars, F, the adjustable guides, h h and c c, when constructed, arranged and operated in the manner and for the purpose specified.

28,570.—W. H. Gilbert, of Bayou Goula, La., and H. O. Ames, of New Orleans, La., for an Improvement in Apparatuses for Evaporating Saccharine Juices:

We claim the connected steam train composed of a series of open pans arranged and connected by "monte jus," substantially as and for the purposes specified.

[The object of this invention is to so construct and arrange an open steam train as not only to provide for the perfect defecation of the juice in the defecator, which cannot be effected in an ordinary kettle train, but to obviate the defects of the ordinary open steam train.]

28,571.—Amos Glover, of Powhatan Point, Ohio, for an Improvement in Corn and Cob Crushers:

I claim, first, The construction of the case, c, with one or more receiving spaces, j, and—

Second, Combining crushers with millstones by means of the driver, m, substantially as and for the purposes set forth in this specification.

28,572.—James Green, of Kennett Square, Pa., for an Improvement in Seed Planters:

I claim the combination of stationary and sliding collars, A B, slotted tube, C, pins, E, rod, o, and grooved nut, M N, for the purpose of forming adjustable seed-distributing receptacles, substantially as set forth.

28,573.—Samuel Hall, of New York City, for an Improvement in Coupling for Shafting:

I claim the cross key, D, in combination with the slotted shafts, B B, coupled within the center hub or coupling, A, by means of the longitudinal keys, E E, arranged and operated as described and for the purpose as specified.

28,574.—J. S. Harper, of Baltimore, Md., for an Improvement in Core Boxes:

I claim a core box which is capable of being expanded and contracted in diameter in the manner described, by the use of two or more toothed bands with catches and figures to designate the size of core required, in connection with the open cylinder or in any other way substantially the same and which will produce the intended effect.

28,575.—W. A. Harris, of Providence, R. I., for an Improved Heel Guard for Boots and Shoes:

I claim affixing to the heel part of a boot, shoe or overshoe, a suitable guard in the manner substantially as described and represented.

This invention consists in applying to the heel part or to the sides or to both sides and heel of an india-rubber or leather shoe or overslides, a piece or pieces of the same material of which the shoe is made, or other suitable material, in such a manner that the same will serve as a guard or protection to the bottoms of ladies' skirts or to gentlemen's pants in wet and muddy weather, against their becoming soiled by rubbing against the muddy boot, and to prevent mud from being thrown up against the dress, in walking—the guard to be applied to the boot, shoe or overshoe in any convenient manner, either by sewing or cementing.]

28,576.—Vines Harwell, of Walker county, Ga., for an Improvement in Cultivators:

I claim the peculiar arrangement and combination of the removable shafts, C, center beam, A, and guide, G, with a cultivator—the whole being constructed and operated in the manner and for the purposes set forth.

28,577.—J. A. Hawley, of Jackson, Mich., for an Improved Composition for Roofing Houses:

I claim making roofs of this composition without the use of tiles or slates or canvas, or any other roofing material or agents, in connection therewith, substantially as set forth.

28,578.—James Hollingsworth, of Chicago, Ill., for an Improved Apparatus for Heating Air by Steam:

I claim the arrangement of the furnace, J, boiler, B, steam boxes and pipes, C D, and air box, A, as and for the purpose shown and described.

I also claim the arrangement of the deflectors, H I J, between the steam boxes and the boiler, as and for the purpose shown and described.

[This invention consists in the arrangement of the steam chest or principal heater within the same air-warming chamber or casing with the boiler, but so far detached from and elevated above the body of the boiler that the air to be warmed may pass under it and between it and the body of the boiler, by which means a much larger steam-heated surface is presented to the air in the warming chamber than when the steam chamber or heater is within or directly upon the boiler. It further consists in a certain arrangement within the air-warming chamber, and in relation to the body of the boiler and steam chest or heater, of deflectors, for the purpose of directing the cold air which enters the chamber under the bottom of the steam chest or heater, and at the same time over and in contact with the body of the boiler and any portion of the smoke flues that may be exposed.]

28,579.—J. B. Hyde, of Newark, N. J. for an Improved Material for Facing Molds for Casting Metals:

I claim the herein-described peaty material for facing molds for casting metals, and which I propose to designate as "Vulcan dust."

I also claim the use of said material when combined with other material for the purpose set forth.

28,580.—E. T. Ingalls, of Haverhill, Mass., for an Improved Machine for Skiving Leather:

I claim, in a machine for skiving counters of boots and shoes, the use of two skivers, one traveling on the arc of a circle, or nearly so, and the other in a straight line, or nearly so, operating substantially as described, whereby both the curved and straight portions of the counter are skived at one operation, as set forth.

In combination with the above, so arranging the knife-stock that the knife, if desired, may bear with an elastic yielding pressure upon the former, so as to be adapted to skiving counters of irregular curves, as set forth.

28,581.—Hiram James, of Barclay, Ill., for an Improved Apparatus for Measuring Liquids:

I claim, first, Measuring chamber, D, and its internal vertical supply tube, E, communicating at its bottom, F, with the chamber, in combination with the vertical adjustable regulating tube, L, essentially as described, so that, by raising or lowering the tube, L, the quantity of measured liquor may be increased or diminished, as desired.

Second, The stoppers, J and G, in their respective coned tubes, I and E, on the rod, H, in combination with the lever, U T, essentially as described, by means of the slot, P, so that the lever may quickly open and close the stoppers at one operation to admit or discharge the measured liquor, without permitting a continuous stream to pass from the reservoir through the measuring chamber.

28,582.—Reuben Jenkins, of Covington, Ky., for an Improved Bedstead:

I claim, first, In combination with main bedstead, A, the arrangement of the secondary bedstead, B, the hollow side rails, F, of which are made to slide into, and be accommodated within, the tubular rails, E, of the main one, in the manner and for the purposes substantially as set forth.

Second, I claim the combination of the divided slats, a a a, and joints, b b, with the sliding side rails, F; the whole being arranged and operated in the manner as set forth, for the purpose specified.

Third, In combination with the bedstead, constructed as described, having hollow metal posts, I claim the bases, H, when made of cedar, sandal or other fragrant wood, arranged in the manner substantially as set forth, for the purpose of rendering the bedstead verminproof.

28,583.—W. F. Johnson, of Wetumpka, Ala., for an Improvement in Cotton Cultivators:

I claim the arrangement of the beam, A, wheel, E, shaft, F, with cutters or hoes, f, attached, and lever, J (with or without the wheel, I), substantially as and for the purpose set forth.

[This invention consists in the use of a rotary wheel attached to a beam provided with hoes or cutters, and so arranged as to be placed under the complete control of the operator and rotated by the draft movement of the machine; the whole being placed in such relation with the beam that the knives or hoes will pass obliquely over the rows of plants and cut or tear them out, as required.]

28,584.—Herman Kaller, of Perry, Ill., for an Improvement in Grain-binders:

I claim, first, The arrangement of the two rotary shafts, f g, with the gear wheels, H I, wiper, i, and cams, n, in combination with the shears, L, and with vibrating curved arm, E, constructed and operating as and for the purpose described.

Second, The arrangement of the dog, g, in combination with the clamp, J, constructed and operating substantially as and for the purpose specified.

Third, The combination, with the rotary spring catch, K, of the two-armed fork, M, substantially in the manner and for the purpose described.

[This invention consists in combining with a vibrating curved arm, which sinks down into a recess in the platform in order to receive the grain, two rotary shafts, connected by gear wheels and furnished with suitable wipers and cams in such a manner that, by operating the curved arm, the grain is held, and by rotating the shaft the wire is cut and twisted around the grain, leaving the gavel in complete order. The wire is confined in a clamp by means of a dog, and, while being twisted, is guided by a two-armed fork, which embraces a circular or oval space to give room to the wire to be twisted.]

28,585.—G. L. Kelty, of New York City, for an Improved Window Curtain:

I claim the lambarkin or fixed window curtain, of buckram or other material, covered in the manner specified.

28,586.—Balthasar Kitt, of Cincinnati, Ohio, for an Improvement in Ringing Bells:

I claim, first The arrangement of the clapper, J, attached to the curved vibrating arm, I, and pivoted to projection, H, and the clapper, J, operated by the cord, M, passing between the rollers, a and b b, and secured to an arm of the wheel, E, as and for the purposes shown and described.

Second, I claim the arrangement described, in relation to the bell, of the two clappers, F and J, by which the sounds shall follow each other at equally successive intervals and with harmonious or concordant sounds.

28,587.—Stephen Krom, of New York City, for an Improvement in Buttons:

I claim the employment of a flanged washer, C, in combination with a flat-headed screw, B, and button, A, substantially as described, so that the head of the screw, by being drawn into the recess formed on the underside of the washer, preserves the evenness of the inner surface of the cloth or other fabric to which the button is attached, affording, at the same time, a good hold on the cloth.

[This invention relates to an improvement in that class of buttons which are secured to the cloth or other material by means of a screw, and it consists in the use of a flanged washer in combination with a flat-headed screw and a button-shaped nut, so that, in screwing this button on the screw, the cloth or other fabric is firmly retained between the head of the screw and the washer, and that, by reason of the flange on the underside of said washer, the cloth or other fabric is clamped at a certain distance from the hole through which the screw passes, giving the button a firm hold and allowing the head of the screw to sink in slightly, nearly to a level with the inside surface of the fabric, and, at the same time, preventing injury to the cloth or other material from turning the button round in screwing it down.]

28,588.—George Leach, of New York City, for an Improvement in Pull Cocks:

I claim the arrangement of the follower, 6, spring, 5, and screw, 7, in connection with the handle or pull, c, and its screw, 8, for the purpose and as set forth.

28,589.—J. W. Logan, of Philadelphia, Pa., for an Improvement in Securing Reef Points of Sails:

I claim, first, Securing single-reef nettles by passing them through eyelets and fastening one side by increasing the diameter of the rope, and the other by securing the nettle by seizing to a jack-line, substantially as described.

Second, Securing double-reef nettles by placing the center of the double-reef nettle close to an eyelet and fastening it by seizing through the eyelet to a jack-line on the opposite side of the sail, substantially as described.

28,590.—John Matthews, Jr., of New York City, for an Improvement in Galvano-plastic Coating for the Interior of Metallic Tubes:

I claim, first, The extension or stretching of the tube by screw threads and nuts, or their equivalents, substantially as and for the purpose set forth.

Second, The use of non-conducting supports, b b, applied substantially as and for the purpose specified.

Third, Providing for the longitudinal movement of the central conductor and its non-conducting supports, b b, within the tube, substantially as and for the purpose set forth.

28,591.—J. W. McLean and Albert Grummer, of Indianapolis, Ind., for an Improvement in Shingle Machines:

We claim the combination of the vibrator with the shears, m m m' the two pins, n n, tumbler, o o, spring, q, in connection with the reciprocating guide, V, substantially as and for the purpose set forth.

28,592.—George Milliran, of Byhalia, Miss., for an Improvement in Cotton Presses:

I claim the arrangement and combination of the carriage or beam, E, toggle lever, D, and follower, C, provided with the friction roller or rollers, f, substantially in the manner and for the purposes specified.

28,593.—Matthew Mitchell, of Altona, Ill., for an Improvement in Seeding Machines:

I claim the combination of the perforated oscillating rim or band, B, stationary perforated cylinder, C, and cut-off, e, arranged substantially as described, and relatively with the seed box, A, and the tube, D, to operate as and for the purpose set forth.

I also claim, in combination with the perforated oscillating rim or band, B, perforated stationary cylinder, C, and cut-off, e, the tube, D, scatterer, F, and share, E; all arranged for joint operation as set forth.

[This invention relates to an improved seed-distributing device, whereby the seed, in passing from the seed box to the furrow, is subjected to two dropping operations, and the seed properly dropped in the furrow prepared to receive it.]

28,594.—Wm. P. Moses, of Exeter, N. H., for an Improved Currying Knife:

I claim the guard, D, as applied to a currying knife, substantially in the manner and for the purpose specified.

28,595.—Daniel Moyer, of New Hamburgh, Pa., for an Improvement in Corn Planters:

I claim the arrangement of the center beam, A, wheel, a, arms, B B and C C, plates, v v and r, the brace, g, bars, c c, hoppers, F, plows, M and N, mold boards or shovels, m, tubes, n, connecting-rods, e, slides, i, and wheels, H, as described, for the purposes specified.

28,596.—Robert Nicoll, of New York City, for an Improvement in Stop-cocks:

I claim the employment or use of two valves, D E, placed at opposite sides of the seat, c, and made to move simultaneously towards and from the seat by means of the right and left screws, or their equivalents, for the purpose specified.

[The object of this invention is to obtain a cock which will have its passage within obstructed in a much less degree than usual by the valve-seat. The seats of ordinary cocks, as is well-known, require to be of a certain degree of thickness, in order to sustain the pressure of the valve, and this thickness acts as a great obstruction to the passage of the water or steam through the cock.]

28,597,—P. H. Niles, of Boston, Mass., for an Improved Telescopic Drinking Cup:

I claim making the cup or bottom part, A, and one or more of its annular sections, B C, with bottom flanches, b b, and applying the cover so as to fit the bottom part, A, and project over the same and the upper edges of its annular section or sections, as described.

28,598.—F. S. Otis, of Brooklyn, N.Y., for an Improvement in Devices for Manufacturing Skeleton Skirts:

I claim the combined reel and former, constructed substantially as and for the purposes specified.

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28,599.—George Palmer, of Littlestown, Pa., for an Improvement in Pumps:

I claim the employment, for united operation, of the spherical chamber, E, diaphragm, d, gum elastic springs, G G, jointed connecting rod, F, and weighted lever, H, when the same are constructed and arranged to operate in combination with an arrangement such as described, for raising and forcing water, as set forth.

[The purpose of this invention is to facilitate the operation of the pump, render the same uniform or regular in its action and capable of being operated with a moderate application of power. The invention consists in the use of an elastic or flexible diaphragm, placed within a suitable c se or chamber provided with spring stops; the elastic diaphragm being connected to a loaded lever, and the whole so arranged as to effect the desired result.]

28,600.—C. G. Plympton and H. M. Plympton, of Walpole, Mass., for an Improvement in Tempering Steel Springs:

We claim the application of water to steel articles while the latter are properly heated and subjected to pressure, or held by dies, presses or other device in the particular form or shape desired, for the purpose of tempering the same, substantially as described.

28,601.—Whitman Price, of Wayne county, N. C., for an Improvement in Plows:

I claim the arrangement of A, the circular beam, B, the standards, C, the shovels, D, the main beam, e, the handles, a, the screw on the upper end of the standards, and h, the screw nut, combined and operating as described and for the purposes set forth.

28,602.—Whitman Price, of Mount Olive, N. C., for an Improvement in Machines for Planting Cotton Seeds:

I claim the arrangement of frame, A, mold boards, a a, leveler, C, wheels, E and L, wheel, D, with arms in hopper, O, arms, H H, flexible joint, K, and standard, M; the whole operating as described, and for the purposes set forth.

28,603.—Eben Pritchard, of Waterbury, Conn., for an Improvement in Calendar Clocks:

I claim, first, The combination of the notched annually revolving cam, E, and the movable extension piece, H, applied substantially as described, in combination with the quadrennially revolving wheel, I, to control the action of a spring upon a dog, G, or its equivalent, for the purpose of completing the revolution of the month wheel, and day-of-the-month index at the end of the months of less than thirty-one days throughout every quadrennial period.

Second, The combination of the pin, 9, on the annually revolving cam, or its equivalent, and the lever-like spring, 7, applied to operate on the stop pawl, i, of the month wheel, substantially as and for the purpose specified.

[This invention consists in certain novel and very simple and sure means of effecting the completion of the revolution of the month wheel at the termination of the months of less than thirty-one days throughout every quadrennial period.]

28,604.—A. H. Rauch, of Bethlehem, Pa., for Improved Devices for Drawing Water from, and Supplying Air to, the Air Vessels of Pumps, &c.:

I claim the drainer, C, applied in combination with the air vessel, A, and furnished with a system of cocks, substantially as described, whereby the water in the air vessel may be exchanged for air, as set forth.

[This invention consists in a novel and simple device whereby the air vessel of a pump may, while the pump is in operation, have a portion of its water exchanged for an equal volume of air at atmospheric pressure as often as water has, by absorption or compression of the air, arrived at too high a level in the air vessel. The same device is also applicable, in the same manner, for a similar purpose to hydraulic rams, or any other hydraulic apparatus in which an air vessel may be used.]

28,605.—C. F. Richter, of Columbia, S. C., for an Improvement in Plows:

I claim the construction and arrangement of the two pieces, E G, the mold board or share, H, and their several connections, for the purpose of uniting them together and allowing the mold board to be adjusted to the pieces, E G, substantially as set forth and explained.

28,606.—G. W. Righter, of Philadelphia, Pa., for Improved Porter Bottle Boxes:

I claim combining and arranging the sides, A A, ends, B B, bottom, C, and partition strips, G, with the metallic frames, D D, and rods, E E E E, substantially in the manner and for the purpose set forth.

28,607.—N. D. Ross, of Braintrem, Pa., for an Improved Churn:

I claim the revolving of the churn-dashers, O, and handle, L, by means of the peculiarly constructed series of dashers, O, and blades, N; the whole being constructed and working as described above.

28,608.—O. P. Rowland, of Jamesport, N. Y., for an Improved Elastic Lining for Boom Jaws:

I claim the application of an india-rubber roll, R, as a lining for boom, gaff and yard jaws, constructed, arranged and operating substantially as and for the purposes set forth.

28,609.—J. S. Sammons, of New York City, for an Improvement in Car Couplings:

I claim the bar or catch, E, dog, D, and disengaging lever, F, combined with a stop or ledge, G, and retaining spring, H, with or without the spring, I; all being placed within the bumper head, and arranged, relatively with each other, to operate as set forth.

[This invention relates to that class of car couplings which are self-attaching and which may be uncoupled or detached without the necessity of the operator or attendant passing between the platforms of the cars.]

28,610.—Charles Scofield, of Adams, N. Y., and Clark Rice, of Watertown, N. Y., for an Improvement in Sewing Machines:

We claim the combination, in the manner shown and described, of feeding dog, P, with the slide, L, and cams, M M′, for the purpose set forth.

We also claim the combination of the sliding wedge, Q, with the spring feeding dog, P, slide, L, and cams, M M′, as and for the purpose shown and described.

We also claim the combination of the pivoted lever hook, l, with the guide plate, F, and plate, H′, spring, m, and cam, p, as and for the purpose shown and described.

28,611.—George Scott, of Cincinnati, Ohio, for an Improvement in Molds for Jars:

I claim a two-part mold for molding jars, when the parts 1 and 2 thereof are made and adapted to be used with a potters' lathe, in the manner substantially as described.

28,612.—E. A. Smead, of Tioga, Pa., for an Improvement in Corn-shellers:

I claim the employment of an upright scroll-shaped shell, E, and drum, A, arranged and operating in respect to each other as shown and described, for the purpose set forth.

[This invention consists in combining with a fluted drum, of the form of a conic frustum, a scroll-shaped concave, having its sides vertical or parallel with the axis of said drum and its lower edge tapering inwards, so as to prevent the ears from escaping through the bottom of the machine and to shell the grain from the points of the ear, and having the discharge aperture for the ears near the point of feed, the same being fluted or ribbed.]

28,613.—C. F. Spencer, of Rochester, N. Y., for an Improvement in Anti-friction Screws and Nuts:

I claim the employment of anti-friction balls, C C, arranged in adjustable sockets in the interior of a threadless nut, B, in combination with a screw, A, which has screw threads formed to fit said balls, substantially as and for the purposes specified.

28,614.—J. K. Staman, of Mifflin, Ohio, for an Improved Boot and Shoe-wiper:

I claim forming a feet-wiper or cleaner, substantially as described, that is to say, by binding corn shucks or other suitable material on to a suitably shaped stock, as and for the purpose set forth.

28,615.—Ptollman Stover, of West Alexandria, Ohio, for an Improvement in Corn Planters:

I claim the peculiar arrangement of the measuring space, having an elastic back piece, k, and an adjustable front piece, j, in connection with the cut-off, g, and lower slide, f; all constructed, arranged and operating in the manner substantially as and for the purposes set forth and described.

28,616.—James Stratton, of Brooklyn, N. Y., for an Improvement in Devices for Regulating the Pressure of Water in Pipes:

I claim the employment or use of the pipe, A′, communicating with the diaphragm chamber, with or without the air chamber, in connection with the supply pipe, A, valve, C, and pipes, D F G, with necessary cock or cocks, arranged to operate substantially as and for the purpose set forth.

I further claim, in connection with the above-named parts, the perforated cap or chamber, J, encompassing the valve, C, substantially as and for the purpose set forth.

[This invention relates to an improvement on a device for regulating the pressure of water in pipes, for which Letters Patent were granted to the inventor, bearing date the 22d day of November, 1859.]

28,617.—James Taylor, of Dartmouth, Mass., for an Improvement in Liquids for Fluid Gas Meters:

I claim the use of the bittern or mother-water left after extracting the crystalizable salts from sea-water, for filling wet gas meters; all in the manner and for the purpose substantially as set forth.

28,618.—Benaiah Titcomb, of Baltimore county, Md., for an Improvement in Harvesting Machines:

I claim the hinged lever, E, provided with the spherical roller, D, or its equivalent, constructed, arranged and operated substantially as and for the purposes set forth.

28,619.—Richard Vose, of New York City, for an Improvement in Car Springs:

I claim the disks, d d d, the caps, a b, the rings, c c, and the central bearings, e e, when constructed and arranged substantially in manner set forth.

28,620.—L. Waddel and W. H. Waddel, of Staunton, Va., for an Improvement in Car Couplings:

We claim the combination of the lever and latch, in the manner described, with especial reference to the security of the coupling and the easy detachment of cars when in motion, and even going up grade.

We do not claim the swinging plate for the purpose of admitting the link, that being somewhat the principle both of the swinging pin and tumbler catch, which are common; nor do we claim it for the purpose of preventing the escape of the link, but only so far as it may be a novelty as a device for holding the link in such a position as to insure certainty in coupling.

28,621.—Thos. Wall, of Jones' Station, Ohio, for an Improved Bedstead:

I claim the flanged sockets and hooked fasteners or clasps, as described, when used in combination with the windlass rail, E, with its pin, f, ratchet, e, and latch, h, all arranged to operate [as and for the purposes set forth.

28,622.—Alonzo Warren and E. Damon, Jr., of Boston, Mass., for an Improvement in Hanging Turbine Wheels:

We claim the globe coupling, A, in combination with the adjustable screw step, B, the same being used for a vertical turbine shaft, in the manner set forth.

This invention consists in a novel combination of hollow spindle shaft, with globular enlargement, adjustable step and stationary shaft, whereby a very short hollow shaft may be used, adding on the top the necessary length of solid shaft. In consequence of thus using a short shaft, there will be less trembing when the parts are in operation, and the parts may be kept well lubricated and in good working order for a great while.]

28,623.—C. L. Williams, of Quincy, Fla., for an Improved Detachable Hook for Suspending Boats:

I claim the combination of lever, C, rod, G, with shoulder, s, on the bar, A, and the treadle, J, all arranged as and for the purposes specified.

[The object of this invention is to attach or detach life-boats from their tackle by a device which, while it forms a secure attachment when the boat is not needed for use, will automatically liberate the same as soon as it touches the surface of the water; thus avoiding the danger of having the boat stove in, and no more than ordinary care is necessary in working the tackle. This invention consists in the use of rods with conical enlaagements on their ends that hang from the lower pulley blocks of the davits, and in applying fixedly to the stem and stern of the boat to be hung from the davits peculiar shaped brackets, which are provided with levers that, in conjunction with shoulders formed on the brackets, receive and hold the conical ends of the rods that are attached to the tackle, by virtue of the gravity of the boat acting upon the lever, so that, when the boat touches the water, the levers will cease to act, and consequently release the boat entirely from the tackle.]

28,624.—T. H. Witherby, of Worcester, Mass., for an Improvement in Rotary Engines:

I claim the abutment, S, applied in connection with the abutment, F, and in combination with a reversing valve, to operate substantially as and for the purpose set forth.

[This invention relates to the further improvement of the improved rotary engine of the late John H. Hathaway, which forms the subject of Letters Patent granted Nov. 15, 1859, to his administrator, Charles Rice, the object of such improvement being to provide for the reversal of the rotary motion.]

28,625.—Joseph Woodruff, of Rahway, N. J., for an Improvement in Harvesters:

I claim the arrangement of the levers, L L′, pulleys, i and k, and cords, h l and m, for operating the reciprocating curved knife, as and for the purposes set forth and described.

28,626.—Lum Woodruff, of Ann Arbor, Mich., for an Improvement in Barometers:

I claim the screw plug, constructed and applied to the reservoir and cistern, substantially as described and operating as set forth.

28,627.—W. C. Bement (assignor to himself and James Dougherty), of Philadelphia, Pa., for an Improved Machine for Cutting Key Seats, &c.:

I claim, first, The described combination of the reversible screwed shaft, C, with the revolving drill or drills, when an intermittent motion at right angles to the said screwed shaft is imparted to the said drill or drills by the devices described, or their equivalents, and when the screw is caused to impart an uniform reciprocating motion to the drills or to the object operated on by the drills.

Second, The hollow spindle, I, its clutches, K and K′, bevel pinions, G and H, and internal rod, J, the whole being constructed and arranged for joint action and combined with the bevel wheel, F, on the screwed rod, C, as set forth, so that the said screwed shaft may be reversed by the movement of the internal rod, J, as set forth.

Third, Operating the reversing clutches from the carriage which carries the drills or which carries the object acted on by the drills, through the intervention of the T-shaped lever, Z, or its equivalent, with its pointed arm, 27, and the spring rod, 26, with its pointed end, the whole being combined and arranged for joint action, substantially as and for the purpose set forth.

Fourth, I claim, in combination with the above-mentioned reversible lever, Z, and its adjuncts, the adjustable screw collars, 17 and 18, connected to the carriage, D, and arranged in respect to the rod, 15, and its adjustable collars, 21 and 22, substantially as set forth.

Fifth, I claim the described stop motion by which the advance of one of the drills is retarded during the movement of the machine; that is to say, I claim furnishing one of the head stocks which carries one of the drills, with a movable nut, l, so arranged as to be thrown out of gear with the screwed shaft, U, by the head stock which carries the opposite drill, through the intervention of the devices described, or their equivalents.

28,628.—Chester Bullock (assignor to himself and De Forest Weld), of Jamestown, N. Y., for an Improvement in Mowing Machines:

I claim, first, The arrangement of means recited for connecting the frame or bars of the fingers and cutters to the frame or body of the mower or machine.

Second, The arrangement of means set forth for allowing of the suspension and for suspending the frame of the cutters and fingers by the side of the mower.

Third, The means recited for uniting the cutter bar to the connecting rod.

Fourth, The arrangement of means described for connecting the draft pole to the mower or machine frame, and for the purposes set forth.

Fifth, The manner of attaching the cutters to the fingers and cutter bar described.

28,629.—Isaac Cook (assignor to himself and Hugh McClure), of Mount Pleasant, Iowa, for an Improved Washboard:

I claim, first, The combination with an ordinary washboard of the reciprocating and hinged rubbers and frames working in suitable grooves, and made yielding to the varying thicknesses of articles placed between the rubbers and board, as and for the purposes set forth.

Second, The arrangement, in combination with the above reciprocating rubbers and frame of a suitable pump, arranged so as to supply water to the top of the board over the articles between the rubbers, as set forth.

This invention consists in combining, in a novel manner, with an ordinary hand-washboard, a swinging frame, capable of receiving a reciprocating motion over the surface of the board, and in suitably bringing within this frame a rubbing board furnished with rollers or rubbing slats, which receives the articles to be washed between it and the corrugated surface of the washboard, holds them in place, and while in this confined state, the frame with the rubbers may be rapidly moved up and down with the hands, giving to the clothes a thorough rubbing, controlled entirely by the hand. And in conjunction with this arrangement, the invention also consists in giving to the rubber and frame, in their attachment to the washboard, an elastic, yielding action, so that the same will themselves be adjusted to the bulk or varying bulk of articles placed between the rubbers and the board. This invention further consists in applying to the side, back or other convenient place about a washboard having a reciprocating rubber, a pump arrangement, which shall be operated by the motions of the said rubber, so as to force water from the tube below up alongside of the board and over on to the articles undergoing the washing operation; the object of which arrangement is to keep the articles well soaked with water while they are being rubbed.]

28,630.—P. D. Cummings (assignor to D. H. Furbish), of Portland, Maine, for an Improvement in Chains:

I claim a chain link strap, one of whose ends has a head formed on it while the other end has a socket to receive the head, substantially as described.

I also claim an open coupling link for chains, with ears located at the outer sides of the legs of the link, as described.

28,631.—P. D. Cummings (assignor to D. H. Furbish), of Portland, Maine, for an Improvement in Gearing:

I claim a universal reversible bolt standard, constructed substantially as set forth, for the purpose of securing a driving wheel to a carriage wheel.

I also claim the combination of the universal reversible bolt standard described with the driving wheel by means of a flange upon the latter, substantially as described.

28,632.—David Fellenbaum, of Lancaster, Pa., assignor to himself and Nathaniel Baker, of Marietta, Pa., for an Improved Variable Cut-off for Steam Engines:

I claim, first, The stationary lifting pieces, f f′, applied and operating in combination with the stems of the puppet valves, substantially as described.

Second, The combination of the two tripping levers, u v and u′ v′, attached to the slide valve, B, and the tripping piece, D, made adjustable within the steam chest; the whole applied and operating in combination with the slide and puppet valves, substantially as and for the purpose specified.

Third, The combination of the lifting pieces, f f′, the two tripping levers, u v and u′ v′, and the tripping piece, D; the whole applied and operating in connection with the slide and the puppet valves, substantially as described, to constitute a variable cut-off.

28,633.—H. W. Fuller (assignor to himself and A. W. Goodell), of Brooklyn, N. Y., for an Improvement in Mechanism for Marking Cloth in Sewing Machines:

I claim forming one, two or more creases in cloth, by means of markers, on opposite sides of the cloth, one of which is connected with the bed of the machine and the other operates simultaneously with vibrations of the needle in a sewing machine, whereby the crease or creases are formed in the cloth itself parallel to the line of sewing, in such a manner that the cloth is ready for doubling over at said creases for the next line of sewing, as set forth.

I also claim marking a line on the surface of cloth, or other material, being sewed in a machine by means of a pencil, or similar article, that is pressed upon the surface of said cloth at the time the needle perforates the same, and is raised therefrom when the feed takes place so as to produce a series of marks parallel to and simultaneous with the line of sewing, as set forth.

28,634.—C. J. Haywood (assignor to the Merriam Manufacturing Company), of Durham, Conn., for an Improvement in Making Tin Boxes:

I claim, first, A properly constructed and arranged friction device, substantially such as described, for securing a head or bottom of a tin box, &c., as the recess die, A, ridges, E, friction sliding plate, C.

Second, I claim a new manufacture of an old article, or tin box, for various purposes, by a new process, substantially in the manner described.

28,635.—Suspended.

28,636.—Wm. May (assignor to J. de Bringe, E. A. Ramsey and W. W. Ramsey), of Winchester, Ohio, for an Improvement in Self-acting Wagon Brakes:

I claim, first, The chain, I, operating in connection with the slotted

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tongue piece, D, when operating reversely upon the same lever with bar, C, for the purpose described.

Second, I claim the construction of the bar, F, and the plate, G, adapted to stops, k l, arranged and operating substantially as set forth, being for the sole purpose of reversing the action of self-acting wagon brakes, in combination as described.

28,637.—W. H. Noyes (assignor to H. T. Litchfield), of Boston, Mass., for an Improved Gage for Filling Barrels:

I claim combining with the filling tube, A, the groove or chamber, B, and its float, C, furnished with an adjustable slide or indicator, as described.

28,638.—J. C. Reed (assignor to himself and S. E. Hutchison), of Cincinnati, Ohio, for an Improvement in Picks:

I claim the employment of the rebate, F, in the jaw, D, when used in connection with a spring jaw, E, and slide, H, to hold the bitt, the spring being constructed so as to retain the slide, substantially as set forth.

28,639.—J. F. Schuyler (assignor to W. E. Lockwood), of Philadelphia, Pa., for an Improved Apparatus for Dressing Grindstones:

I claim the described dressing wheel, composed of a series of radiating sharp-pointed chisels, situated between two yielding washers, the whole being arranged and hung to the stem, C, or its equivalent, substantially in the manner and for the purpose set forth.

28,640.—John Tiebout (assignor to himself and William Tiebout), of Brooklyn, N. Y., for an Improved Bung-cutter:

I claim, first, The combination with the disk, F, and arms, f, of the adjustable hinges, c, as used for the purpose shown and described.

Second, The combination of the tubular projection, D, and adjustable guide plates, h, with the sliding shaft, C, and disk, F, as and for the purpose shown and described.

[The object of this invention is to cut different sized bungs or corks with the same set of cutters, and it consists in arranging the cutters on bent arms which are attached to movable hinges fastened to a disk that is rigidly secured to the driving shaft, and which slide up and down in adjustable guides that are secured to another disk, so that the points of the cutters are spread or brought closer together as the bent portions of the arms passes through said guides, and that by adjusting the guides and the movable hinges different sized bungs or corks may be cut.]

28,641.—Joshua Turner, of Cambridgeport, Mass., assignor to himself, F. Guild, E. C. Daniell and Warren Covell, of Dedham, Mass., for an Improved Machine for Buffing and Reducing Leather:

I claim the combination of the rotary grinder, B, the bed roller, E, the draft roller, D, and the brush, F, arranged and made to operate together substantially as described and for the purpose as specified.

I also claim the application of the feed and bed rollers to a rocker frame, c, or its equivalent, and combining therewith devices substantially as described, whereby the two rollers may not only be simultaneously moved away from and toward the buffing cylinder, B, but the feed roller be moved from and toward the bed roller; such devices being the springs, c c, the rotary windlass, H, and its connections, b' b' e e, and the band and treadle, I, or other equivalent means.

I also claim supporting one of the rocker frame bearings in a slider and providing such with adjusting screws, the same being for the purpose as specified.

RE-ISSUES.

The New York Rubber Company, of New York City, assignees of C. H. Hinckley, of Stonington, Conn., for an Improved Coating for Hose-pipe. Patented Sept. 29, 1857:

I claim constructing hose of flexible tubing of textile and fibrous material with an internal waterproof coating, by first applying said coating on the outside of the cloth or other pipe, and then inverting the coating pipe by drawing it over and through a metallic cylinder, or otherwise suitably inverting the same.

Jacob Swartz, of Buffalo, N. Y., for an Improvement in Grain and Grass Harvesters. Patented Nov. 14, 1854:

I claim, first, The combination of the main frame, A, carrying the cutting apparatus, and the finger bar, C, with the vibratable coupling arm, Q, the whole constructed and operating substantially as described and for the purpose set forth.

Second, In combination with the main frame, A, vibratable coupling arm, Q, finger bar, C, shoe or shield, C', upright post, P, arm, I, hinge pins, u and v, the guiding slot, O, and set screw, d, or their equivalent; the whole arranged and operating as specified for each or all of the purposes set forth.

Third, The combination of the main frame, A, finger bar, C, and cutter bar, y, when the bar is connected to the main frame by the vibratable coupling arm, Q, and the whole is arranged so that the relation between the finger and cutter bars is not materially changed in raising and lowering the cutting apparatus, substantially as described.

Fourth, I claim the combination of the main frame, A, shoe or shield, C', and the vibratable coupling arm, Q, or its equivalent, when the whole are constructed and operate substantially as specified for the purpose set forth.

Fifth, I claim the combination of the short finger b r, C, and the shoe or shield, C', connected to the main frame by a hinged coupling arm, with the main frame, A, when the several parts are constructed, arranged and operate in the manner and for the purposes specified.

Sixth, I claim the combination of the short finger bar, C, the shoe, C', divider, g2, and main frame, A, when the said finger bar, shoe and divider are each constructed in the peculiar manner specified, and the whole arranged together and with the main frame, as and for the purposes described.

Cyrenus Wheeler, Jr., of Poplar Ridge, N. Y., for an Improvement in Grain and Grass Harvesters. Patented Feb. 6, 1855:

I claim, first, So combining a hinged finger bar and main frame, with levers, substantially as described, extending towards the driver's or conduc r's seat, as that the occupant of said seat can, without leaving his position, raise up either end of the finger bar independently of its other end, or raise up both ends thereof at pleasure, substantially as described.

Second, I claim the platform bar, Q, as a means of securing the platform to the finger beam, and for strengthening said finger beam when it has the platform to carry, substantially as described.

Third, I claim the inclined caster wheel, S, arranged as represented and in combination with the platform, whereby the latter is elevated when the machine is being turned short around to the right, substantially as described.

Fourth, I claim, in combination with a finger beam and platform placed in rear of the main supporting wheel, the two casters, N S, arranged as described, for allowing the machine to turn short round to the right, for the purpose specified.

Fifth, I claim a revolving track-clearer when operated from a ground wheel through gearing substantially as described.

C. H. McCormick, of Chicago, Ill., assignee of L. J. McCormick, W. S. McCormick and C. H. McCormick, for an Improvement in Reaping and Mowing Machines. Patented May 11, 1858:

I claim making the finger beam of a mowing machine of a bar of iron, wedge-formed in its cross section with its forward edge, which carries the fingers made thin, that the sickle may act upon and cut leaning grass, and with its rear edge thick to obtain the required strength, and the under surface inclined and so arranged that it may act like a runner to pass and ride over the surface of the ground to keep the cutting edge of the sickle clear of obstructions, whilst at the same time it can have access to leaning grass, all substantially as described.

C. H. McCormick, of Chicago, Ill., assignee of L. J. McCormick, W. S. McCormick and C. H. McCormick, for an Improvement in Reaping and Mowing Machines. Patented May 11, 1858:

I claim, first, An improvement adapting the machine to mowing grass, consisting of the segmental pivoted frame, its gearing and the driving wheel, in combination with the main frame having the cutting apparatus projecting on one side thereof and carrying the other portion of the gearing, the whole arranged substantially as and for the purpose specified.

Second, An improvement adapting the machine to reaping grain, consisting in the combination of the main frame carrying one portion of the gearing and having a platform, grain wheel, divider and cutting apparatus projecting on one side thereof with auxiliary frame work, the other portion of the gearing, the driving wheel, a pivotal connection for uniting the two portions of the gearing, and the two frames, and the toothed hinged sector and detent to provide for shifting the main frame and platform to, and holding them at different hights, substantially as described.

Third, An improvement applicable to the machine when adapted for either mowing grass or reaping grain, and consisting of the combination of the sector with the reversible detent, adapted to performing the double duty of detent and guide, substantially as described.

C. H. McCormick, of Chicago, Ill., assignee of L. J. McCormick, W. S. McCormick and C. H. McCormick, for an Improvement in Reaping and Mowing Machines. Patented May 11, 1858:

I claim the guard finger, having a thin shank, a narrow neck and a strengthening rib, substantially as described.

C. H. McCormick, of Chicago, Ill., for an Improvement in Machines for Cutting Grass, &c. Patented Sept. 21, 1858.

I claim the combination of the sickle having the scalloped or indented edge and serrated reversed teeth, with a series of fingers having the back reversed angles for supporting the grain or grass to be cut to the edge of the sickle, both above and below the edge, or above the edge only, substantially as described.

I also claim cutting out the middle of the upper part of the fingers that project over the sickle, as described, in combination with the vibrating sickle, as described, for the purpose specified.

C. H. McCormick, of Chicago, Ill., for an Improvement in Cutting Apparatuses for Machines for Cutting Grass, &c. Patented Sept. 21, 1858:

I claim the combination of a series of slotted fingers with a vibrating scalloped cutter, having projections on both its upper and under sides to facilitate the detachment and discharge of clogging matter, substantially as described.

C. H. McCormick, of Chicago, Ill., for an Improvement in Machines for Cutting Grass, &c. Patented Sept. 21, 1858:

I claim, in the combined blade and bar of a scalloped vibrating cutter, making the bar extend behind the blade, substantially as described, for the purpose specified.

EXTENSION.

Daniel Carmichael, of Brooklyn, N. Y., and Jason C. Osgood, of Chittenango, N. Y., for an Improvement in Dredging Machines. Patented May 30, 1846:

I claim the manner described in which we have connected and combined the scraper staff or arm with the machine, so that it may be raised or lowered by means of the racks and pinions (by the aid of the triangular piece), arranged and operating as set forth, thereby dispensing entirely with the hollow mast and with the toothed gearing and chain combined with said mast as used for that purpose in the original machine of Otis.

NOTE.—In the above list of claims, issued for the week ending June 5th, we recognize THIRTY-THREE of the number which were solicited through this office.—EDS.

MONEY RECEIVED

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, June 9, 1860:—

J. C. C., of Conn., $73; J. H., of Pa., $25; J. R. C., of Ind., $20; L. A., of Wis., $25; W. W., of Wis., $25; J. A., of Ill., $10; J. T., of La., $55; L. E., of Mich., $45; J. K., of N. Y., $25; E. C. C., of Mass., $10; H. & F., of Ga., $28; B. J., of Ky., $25; C. V. S., of Ill., $30; McC. & J., of N. J., $30; J. A. V., of Cal., $25; C. A. T., of Ill., $25; G. K. P., of Mass., $30; J. O. C., of Conn., $28; H. & P., of N. J., $25; J. M., of N. Y., $75; S. T. V., of R. I., $25; M. & B., of R. I., $30; F. H., of S. C., $30; J. P. A., of Ga., $25; N. M., of Ohio, $25; W. W. M., of Ill., $30; J. H. S., of La., $20; J. S. D., of Ohio, $30; G. W. R., of N. Y., $100; E. W. F., of La., $25; D. P., of Ill., $30; M. B., of N. H., $35; H. E., of N. Y., $30; J. S., of Ill., $25; R. W. P., of Mass., $30; C. M., of Wis., $30; A. L., of Mich., $25; E. A. L., of L. I., $25; H. A. W., of N. Y., $28; W. T., of Conn., $25; T. & S., of Ill., $25; D. B., of Mich., $55; E. G. E., of Wis., $30; W. T. Z., of Tenn., $55; C. G., of La., $55; A. S. B. of Iowa, $20; J. P. M., of Ill., $10; J. P. H., of La., $15; I. W., of Vt., $30; T. W., of Iowa, $25; P. F., of Miss., $30; S. E. T., of N. J., $30; J. G., of Mass., $25; J. B. L., of N. J., $30; E. L. P., of Conn., $30; C. D., of Mass., $5; D. B., of Mich., $25; K. & H., of N. Y., $25; N. Q. M., of Wis., $25; G. A. L., of Ill., $25; J. H., of Iowa, $30; D. W. M. L., of Ohio, $25; F. A. G., of Ill., $25; C. B. C., of Mass., $30; G. Van C., of N. J., $28; B. S. P., of Conn., $15; J. S. B., of N. Y., $25; O. & W., of Ill., $30; O. & L., of N. Y., $25; J. S. McC., of N. Y., $40; J. M., of N. Y., $30; A. O., of Pa., $70.

Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, June 9, 1860:—

H. & P., of N. J.; A. P. T., of Ga.; E. A. L., of L. I.; C. T. P., of L. I.; H. & F., of Ga.; T. & S., of Ill.; J. S. of Ill.; L. & W., of Tenn.; B. J., of Ky.; T. W., of Iowa; H. A. W., of N. Y.; J. H., of Pa.; W. T., of Conn.; J. P. A. of Ga.; P. N. B., of N. Y.; J. P. H., of La.; J. K., of N. Y.; C. A. T., of Ill.; E. G. E., of Wis.; J. G., of Ky.; D. B., of Mich.; G. G., of Wis; S T. V., of R. I.; L. A., of Wis.; E. C. C., of Mass.; N. M., of Ohio; W. W., of Wis.; J. G., of Mass.; W. H. A., of Iowa; M. B., of N. H.; J. M., of N. Y., (3 cases); D. W. L., of Ohio; A. L., of Mich.; N. Q. M., of Wis.; J. C. C., of Conn.; E. G. P., of N. Y.; K. & H., of N. Y.; G. Van C., of N. J.; F. A. G., of Ill.; G. A. L., of Ill.; O. & L., of N. Y.; J. S. McC., of N. Y.; A. O., of Pa.

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OXFORD, Md., June 1, 1860.
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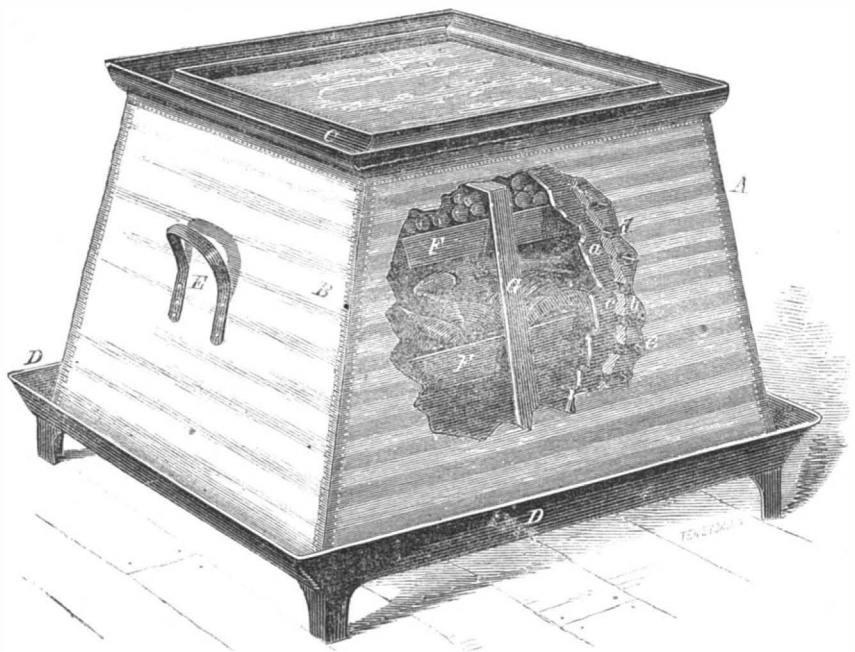
IMPROVED REFRIGERATOR.

When life, either animal or vegetable, has departed from organized beings, the elements of which they are composed are forced asunder by the action of heat, and the rapidity of the decomposition depends upon the degree of heat to which they are exposed. If placed in a furnace of burning coal, a few hours at most suffices to dissipate the elements and scatter them abroad into the atmosphere; but at a temperature below the freezing point of water, organisms may be preserved—like the frozen elephants which are found among the icebergs of Siberia—for thousands of years, and perhaps for hundreds of thousands. This general law of the rapidity of decomposition depending upon the degree of the temperature, has forced itself upon the notice of people in many of the operations of life, and hence the very general practice of retarding the decay of meats and vegetables by keeping them in a cool place. In cities, the usual mode of cooling a refrigerator is to place a piece of ice in it, but in many parts of the country this luxury is not to be had, and its place has been partially supplied by a plan of cooling by evaporation. The annexed engraving illustrates one of the latest inventions of a refrigerator of this class.



BAKER'S IMPROVED REFRIGERATOR.

The interior surface, *a*, of the box, A, is made of slate or other good conducting material, surrounded by an outer wall, *b*, of wood or other slow conductor of heat, with an air space, *c*, between the two walls. The outer wall has grooves both in its exterior and interior surfaces, with holes connecting the grooves for the circulation of the air. The whole is covered with a canvas, B, which is kept constantly wet by water dripping upon it through holes in the reservoir, C; a dish, D, being provided to catch the waste in case the supply should be excessive. By means of the handles, E, the box may be lifted out of the dish, in order to obtain access to the contents which are kept on the shelves, F F, supported by the frame work, G. The canvas being kept wet and, a constant circulation of air being maintained on both its surfaces, a rapid evaporation is produced which, by the conversion of sensible into latent heat, reduces the temperature of the refrigerator.

The patent for this invention was secured through the Scientific American Patent Agency, April 3, 1860, and further information in relation to it may be obtained by addressing the inventor, W. M. Baker, at Walpole, Ind.

TUSCH'S SOAPING AND SCRUBBING BRUSH.

It is frequently remarked—and with much truth—that patents for simple contrivances prove, in the majority of instances, more profitable than inventions of a complicated character, where much time, labor and capital are required in introducing them. In proof of this assertion, the accompanying engravings exhibit an invention of a strikingly-simple yet ingenious character, and one which will doubtless prove as profitable to its designer as it is useful to the public; it is a brush of peculiar construction, which will obviously recommend itself to the approbation of all lovers of cleanliness—the virtue which is said to be "next to godliness." Brushes are divisible into three classes, according as they are used for removing dirt, polishing surfaces, or applying colors; the invention here illustrated appertains to the first of these classes, and it consists in a mode of attaching a cake of soap to the back of a brush in such a manner that, after its attachment, the cause of its adhesion is invisible, although it (the soap) is held perfectly secure during every manipulation of the brush in all kinds of washing and scrubbing operations, until it is completely used up.

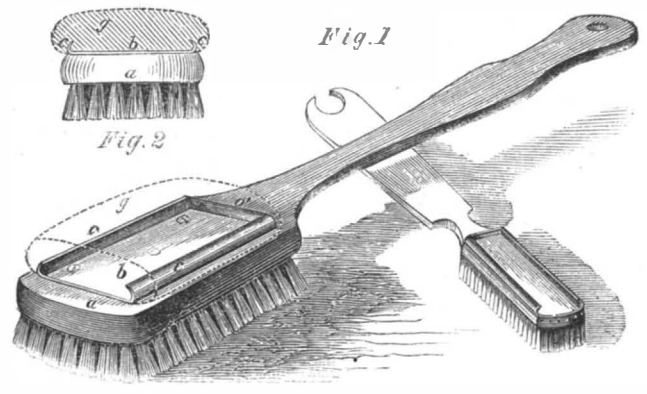


Fig. 1 is a perspective view of an ordinary long-handled flesh-brush; to its back, *a a'*, there is attached a metal plate, *b*, which is secured by rivets or any other convenient fastening; the lateral edges of this plate are turned up and over, so as to form a curved groove, as shown at *c c*; and against the sharp extremities of these edges the lower portion of one end of a cake of soap (shown by the dotted outline, *g*) is pushed in a horizontal direction, with a slight downward pressure. The soap thus becomes incorporated with the brush, as effectually as if the two articles were made of the same material. Instead of the curved groove above shown, the edges of the plate may be abruptly turned up at an acute angle in relation to the back of the brush, so as to form an angular or dovetailed groove, which will be found equally as useful as the curved one; and instead of having one broad plate, two narrow and suitably-bent strips of metal may be applied, one at each side of the brush. Fig. 2 is an end view of the same brush, showing the depth to which the edges of the plate penetrate the soap. Beneath the brush represented in Fig. 1, there is shown a nail-brush having the described device attached to it.

The patent for this invention was secured, through the Scientific American Patent Agency, on May 22, 1860, and further information in relation to it may be obtained by addressing the inventor, Wm. Tusch, Brooklyn, N. Y.

SIXTEENTH YEAR!!!

On the 1st of July next, the THIRD VOLUME of the "NEW SERIES" of the SCIENTIFIC AMERICAN will be commenced.

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